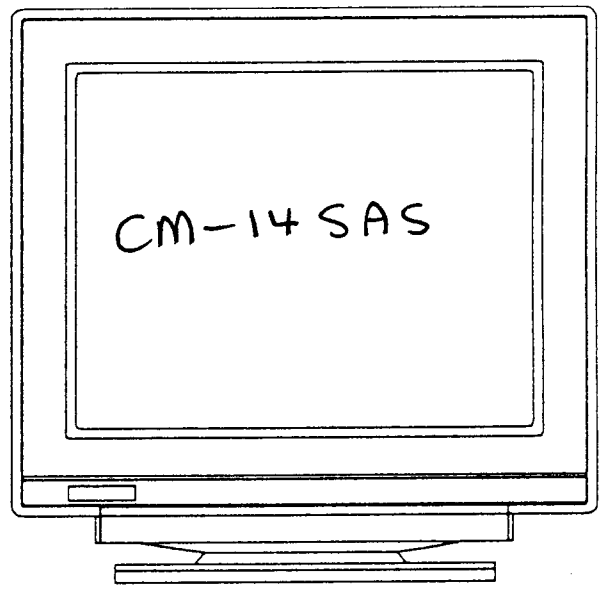
Service Manual

14″ SUPER-VGA(2S) COLOR MONITOR



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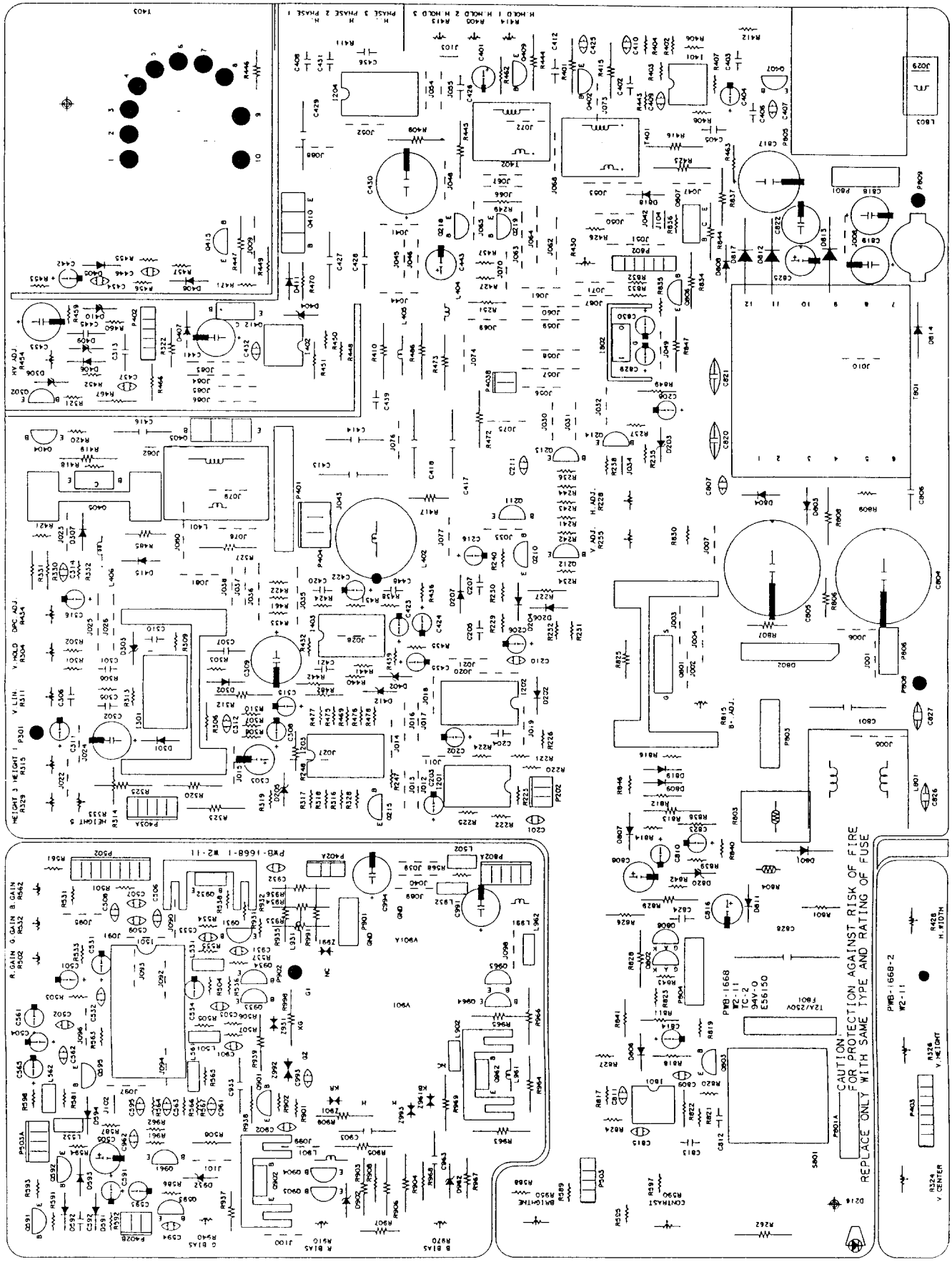

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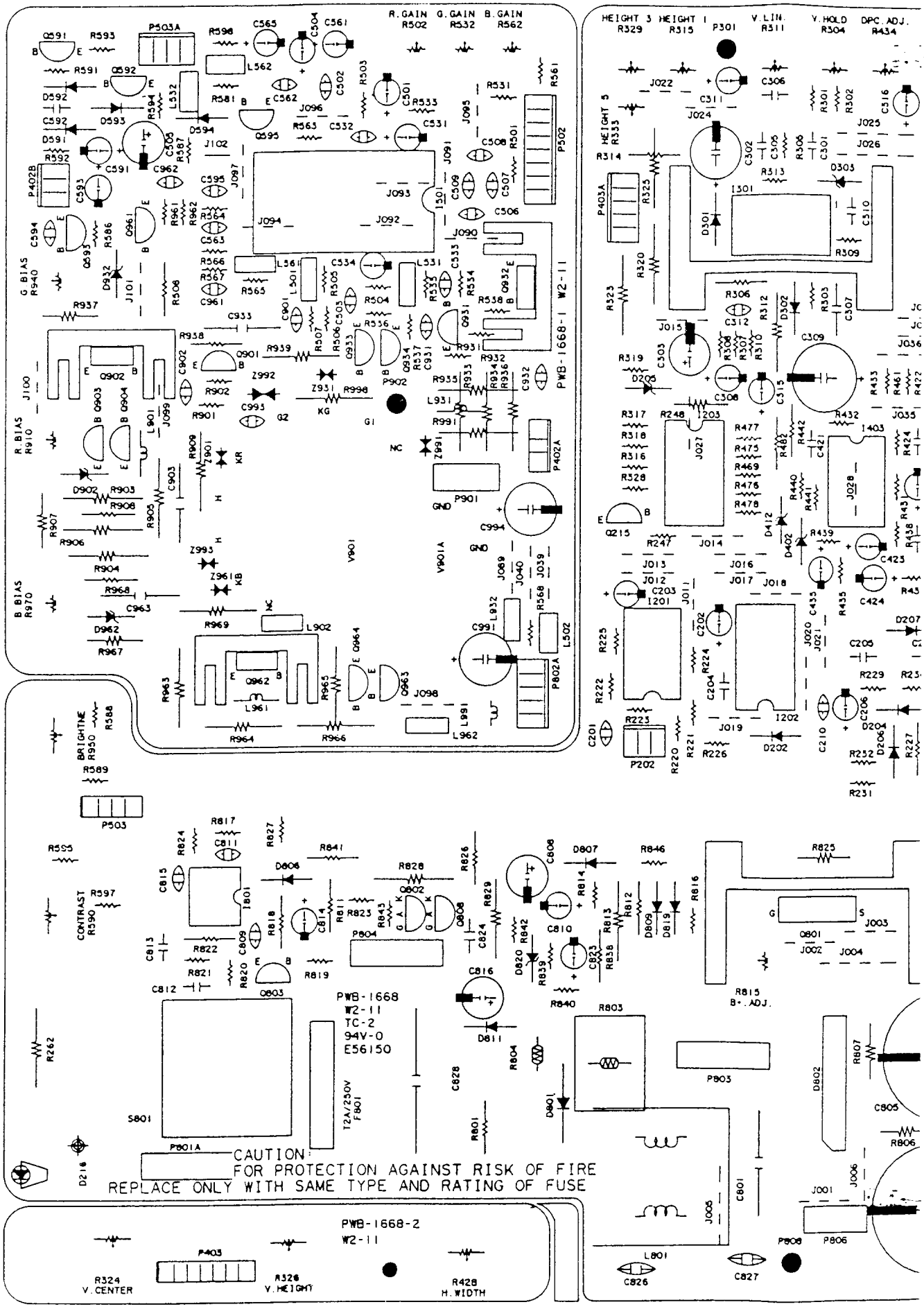

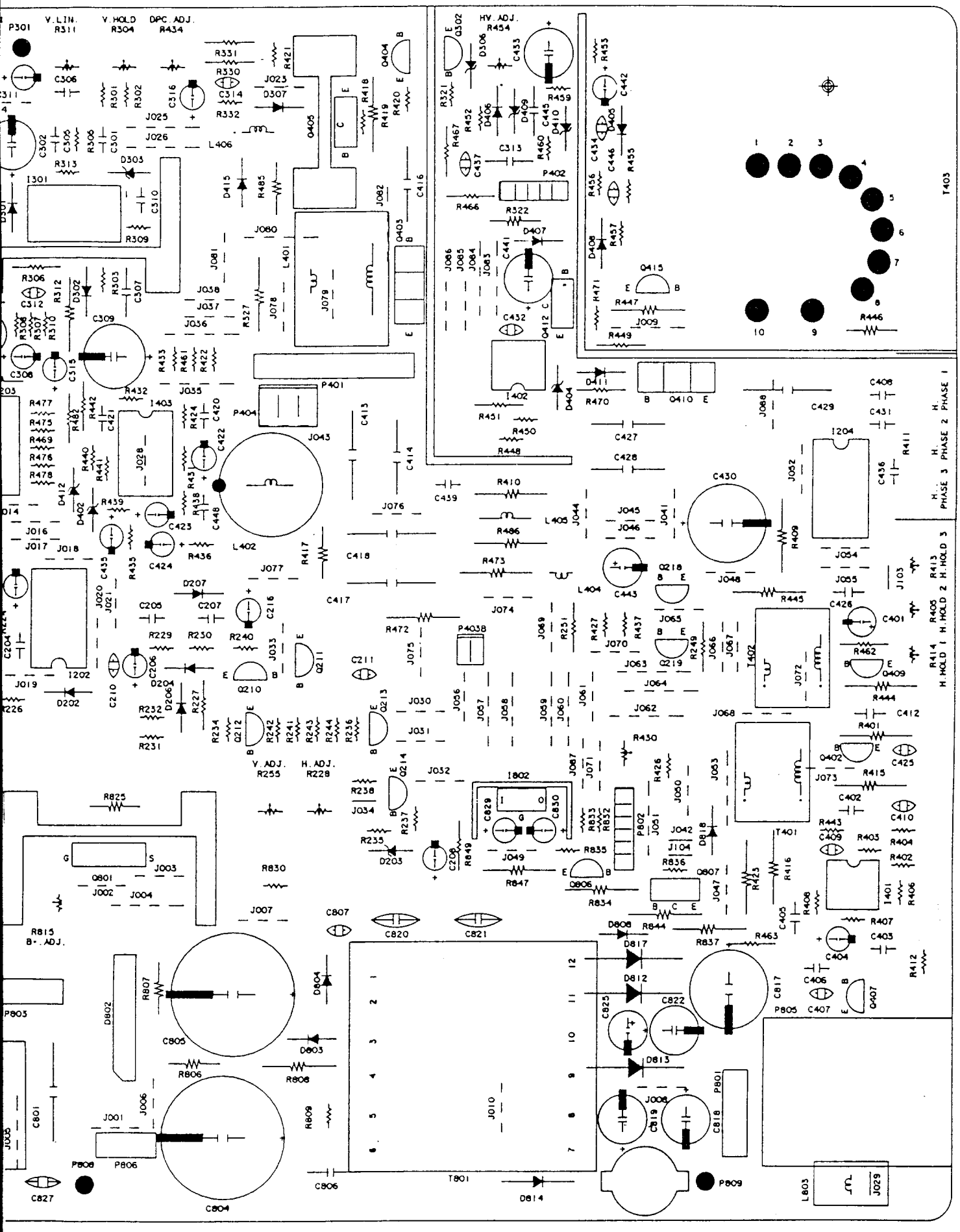
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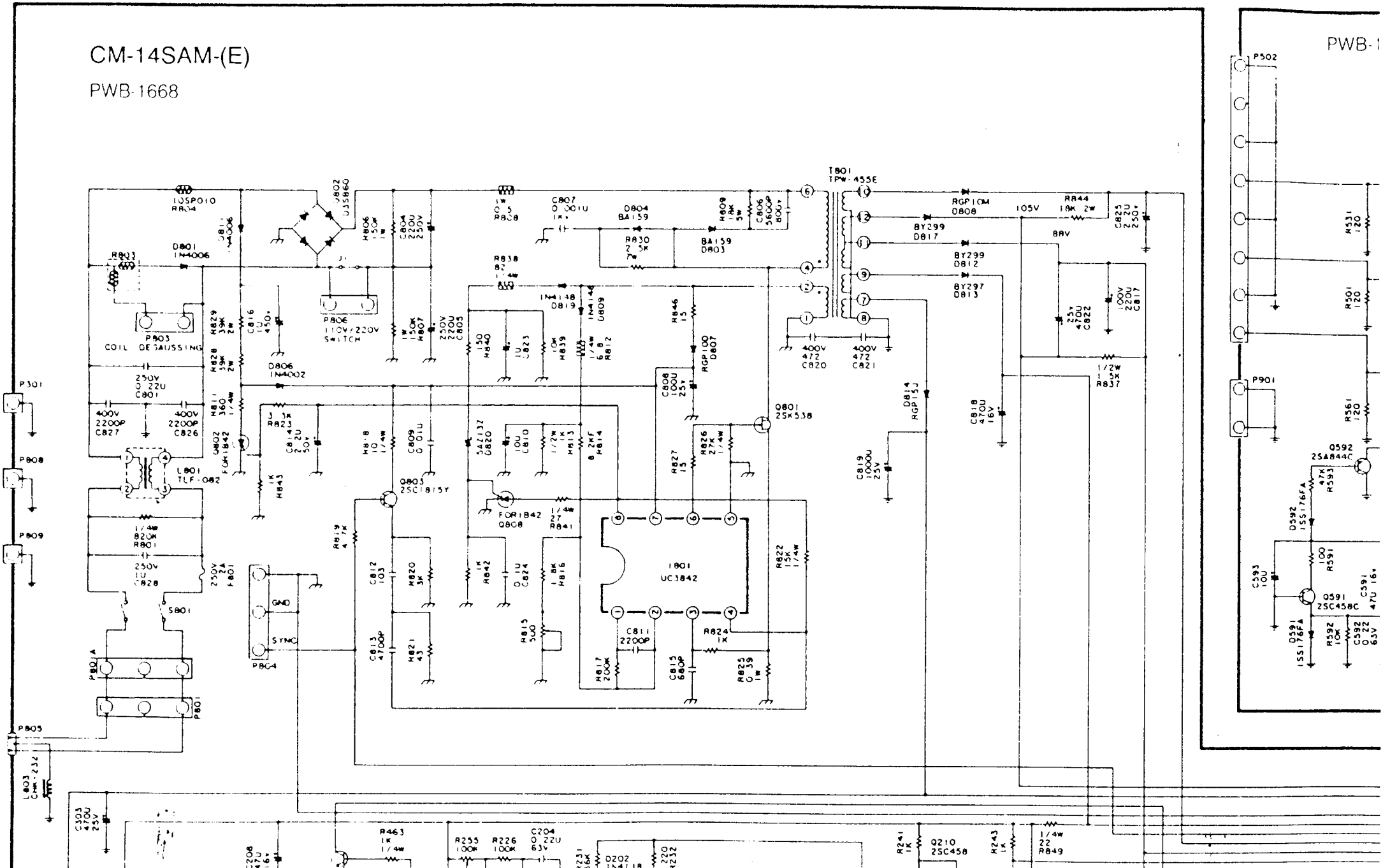

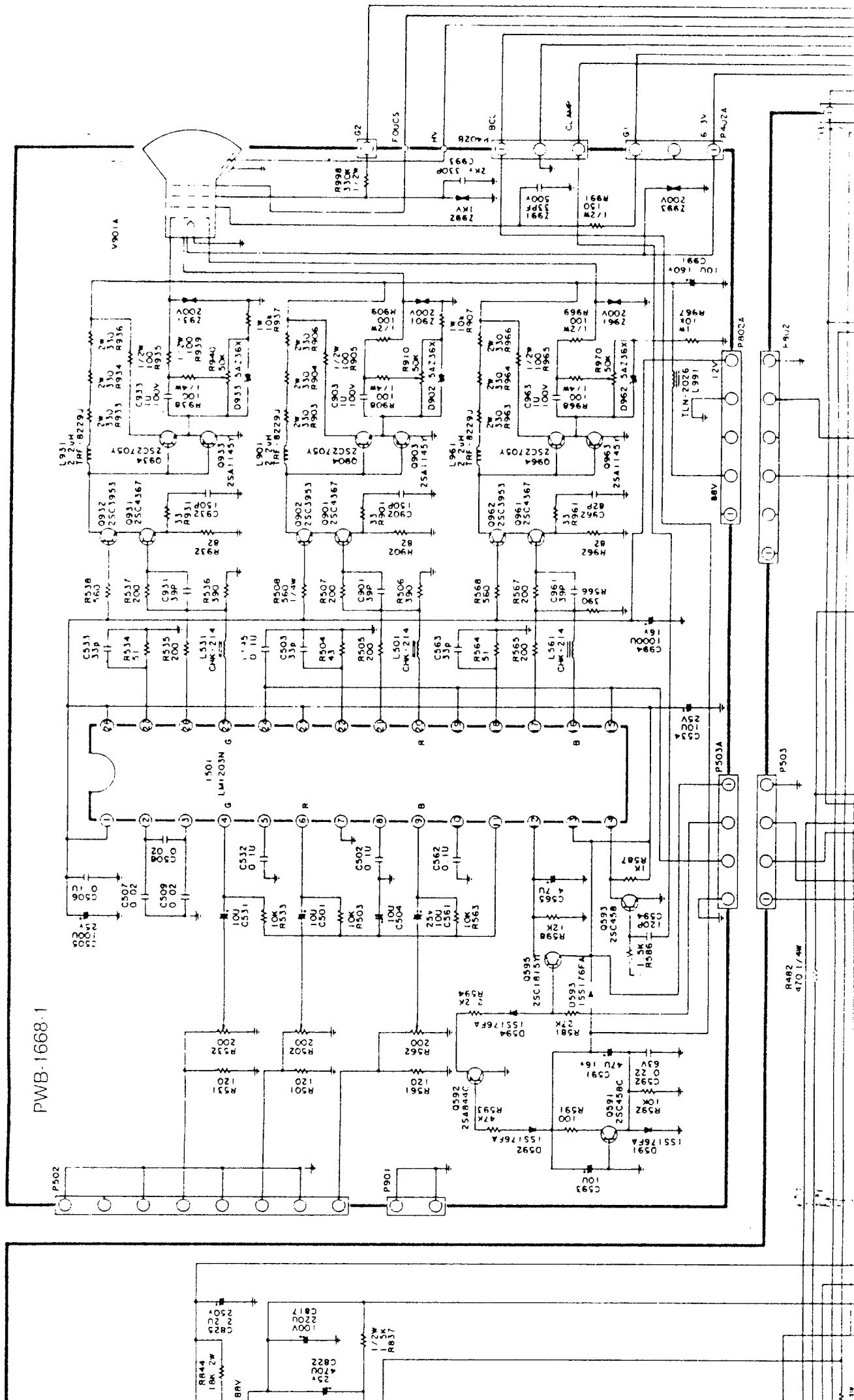
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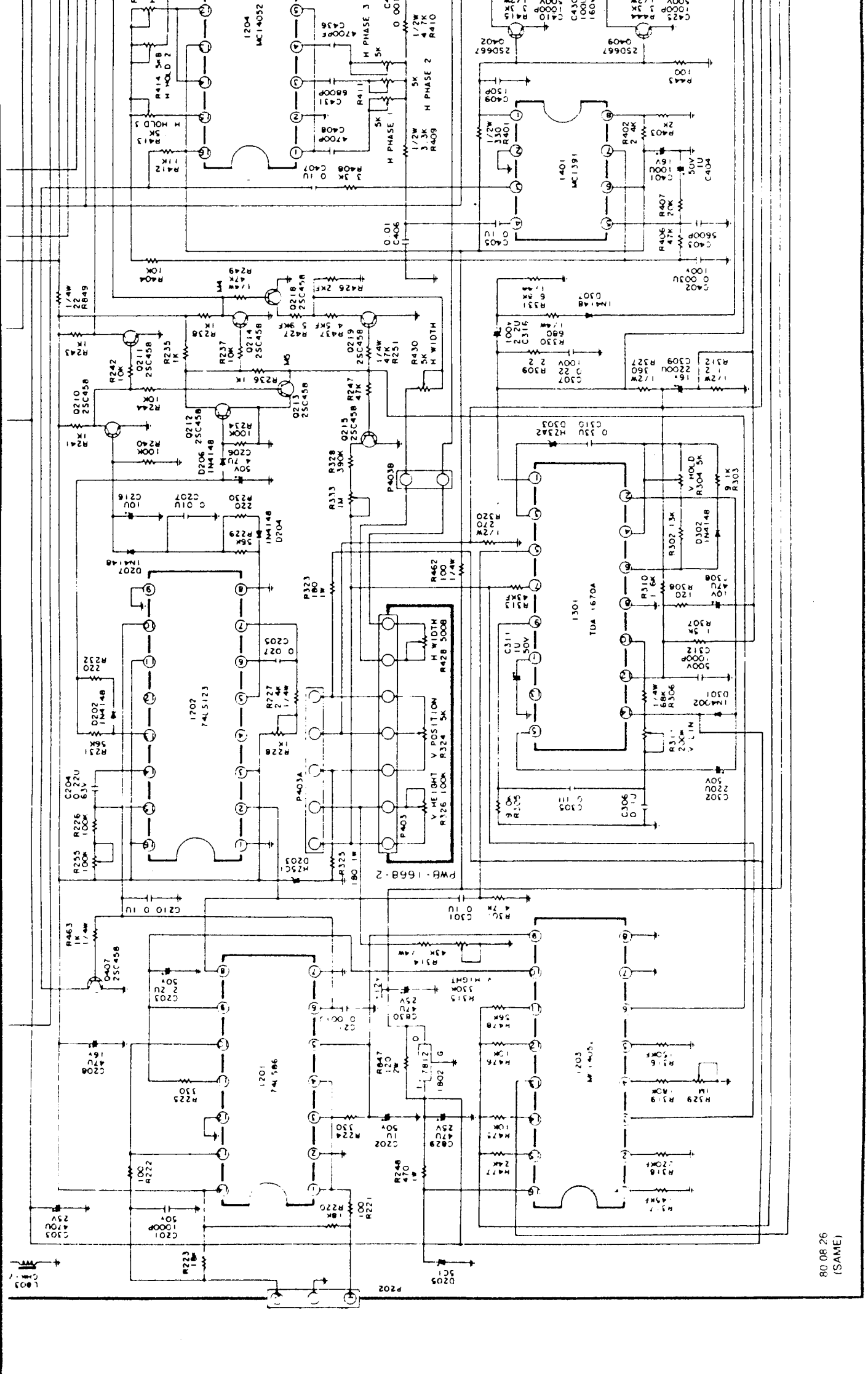
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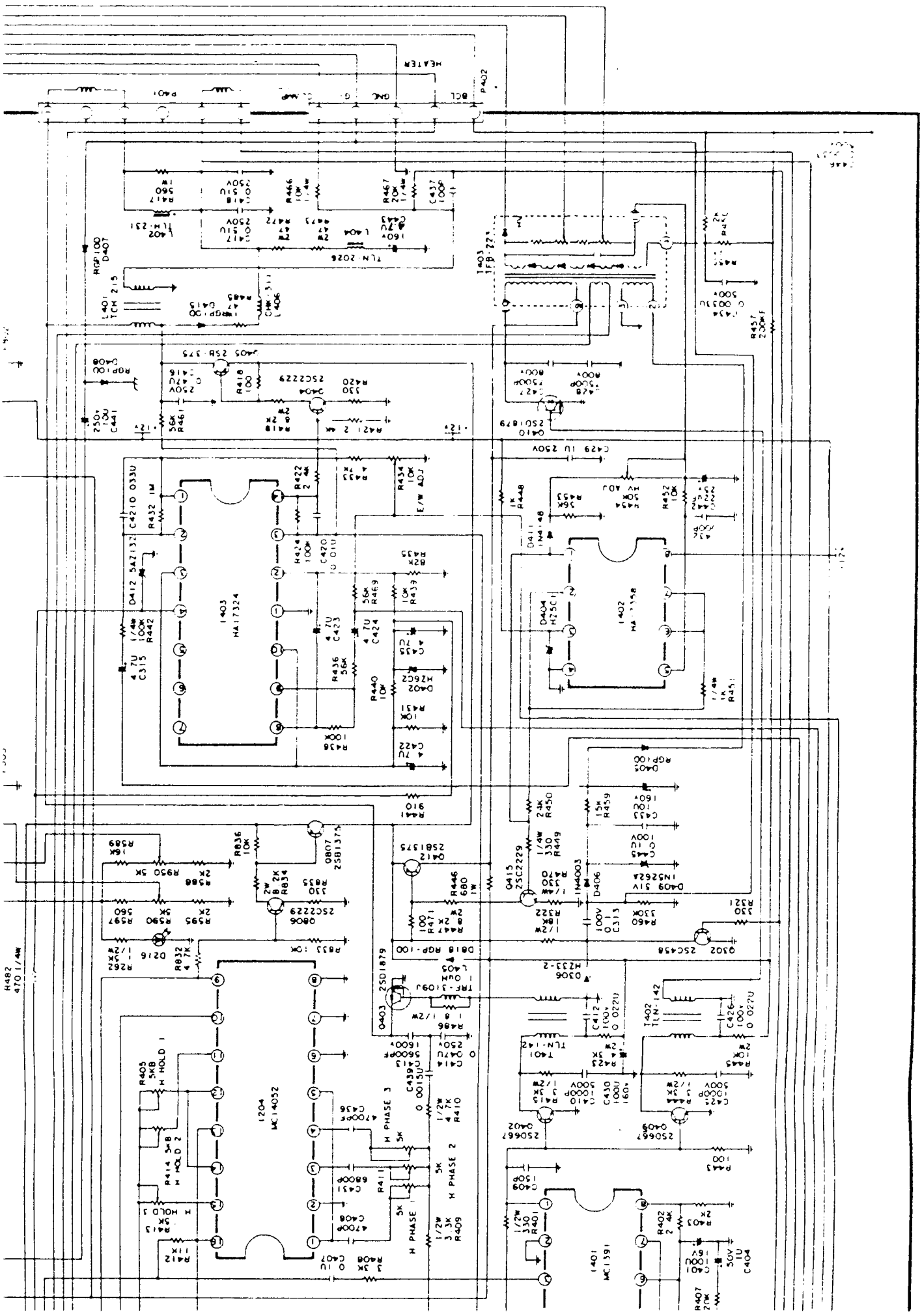

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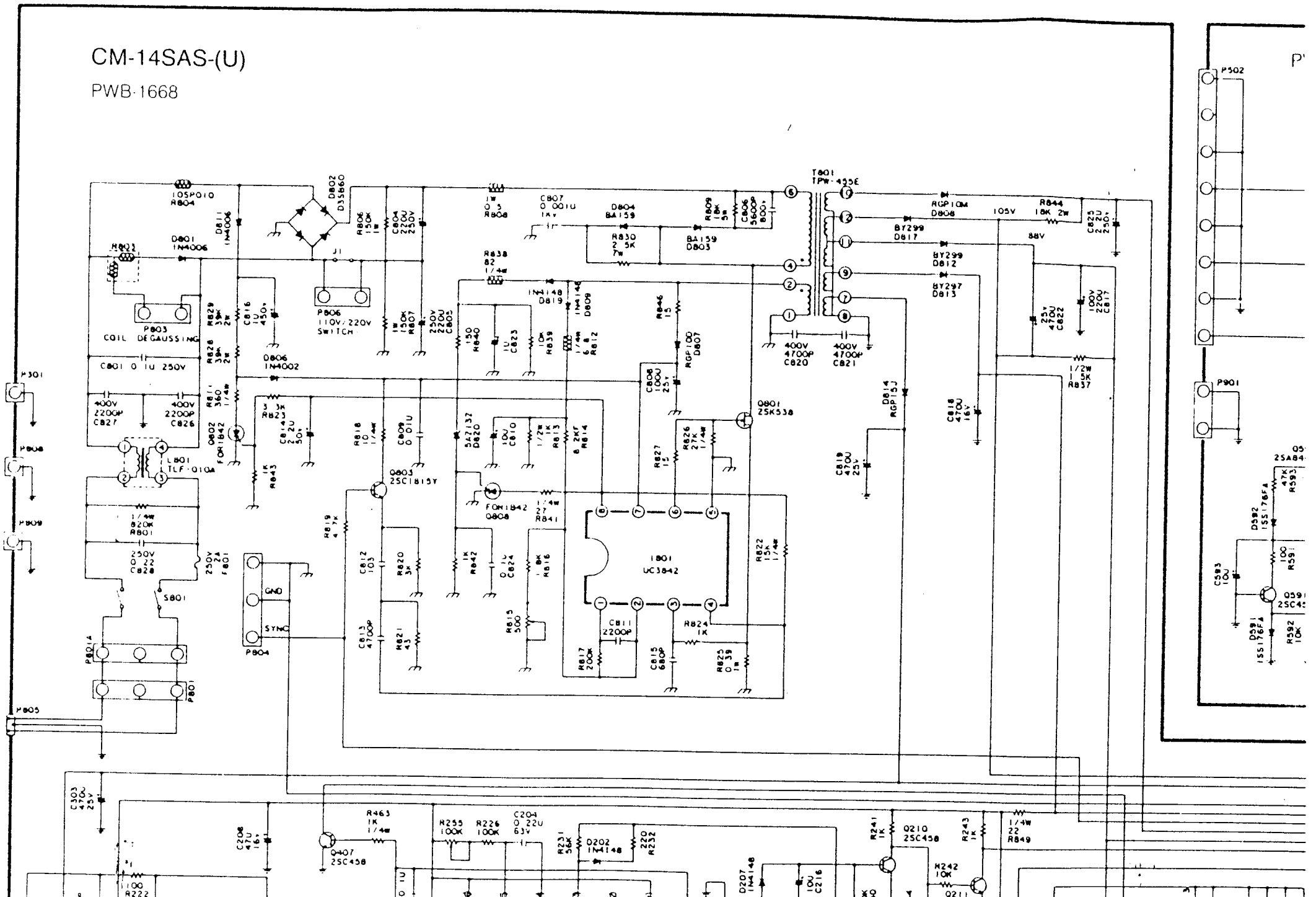

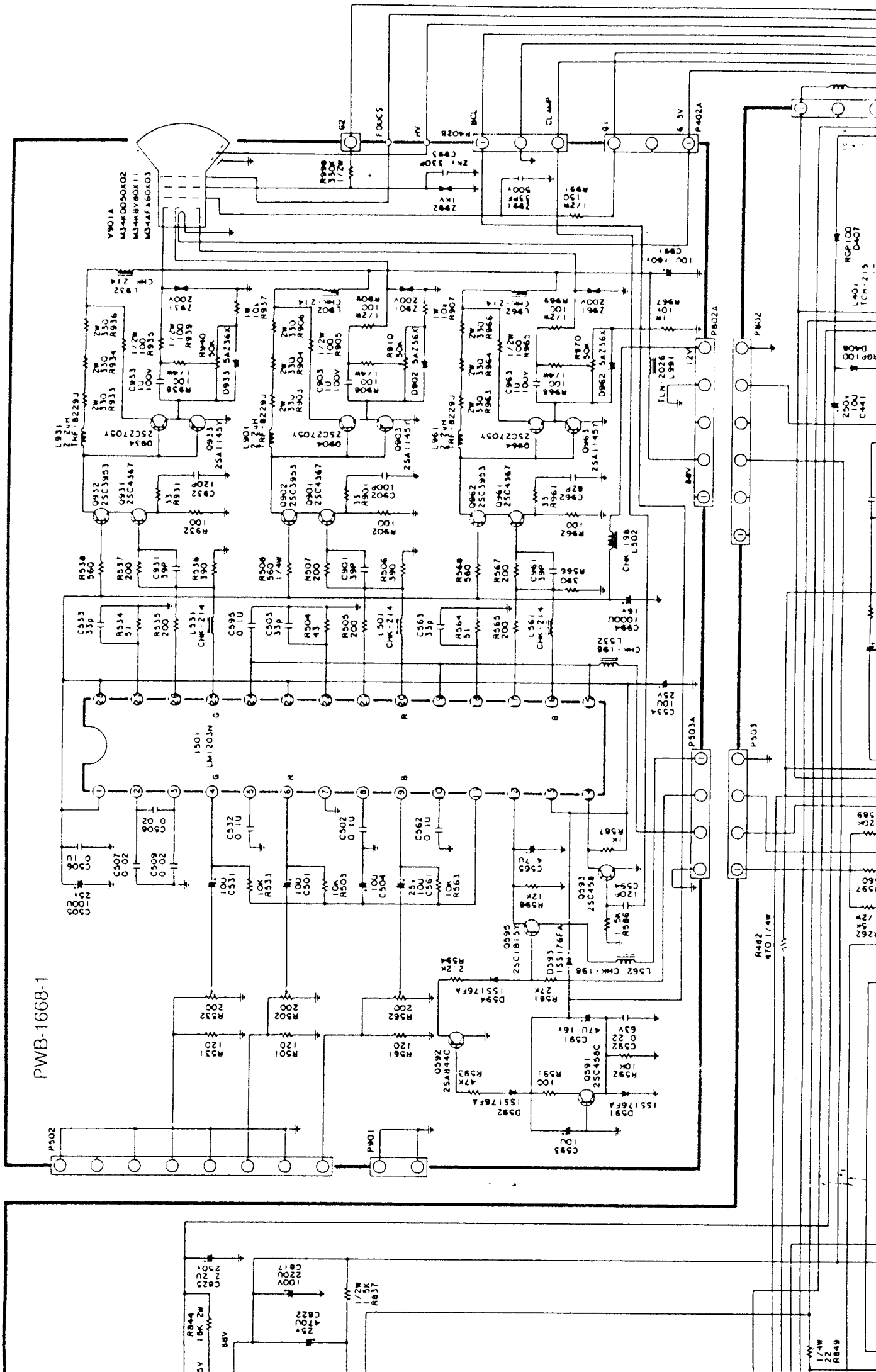
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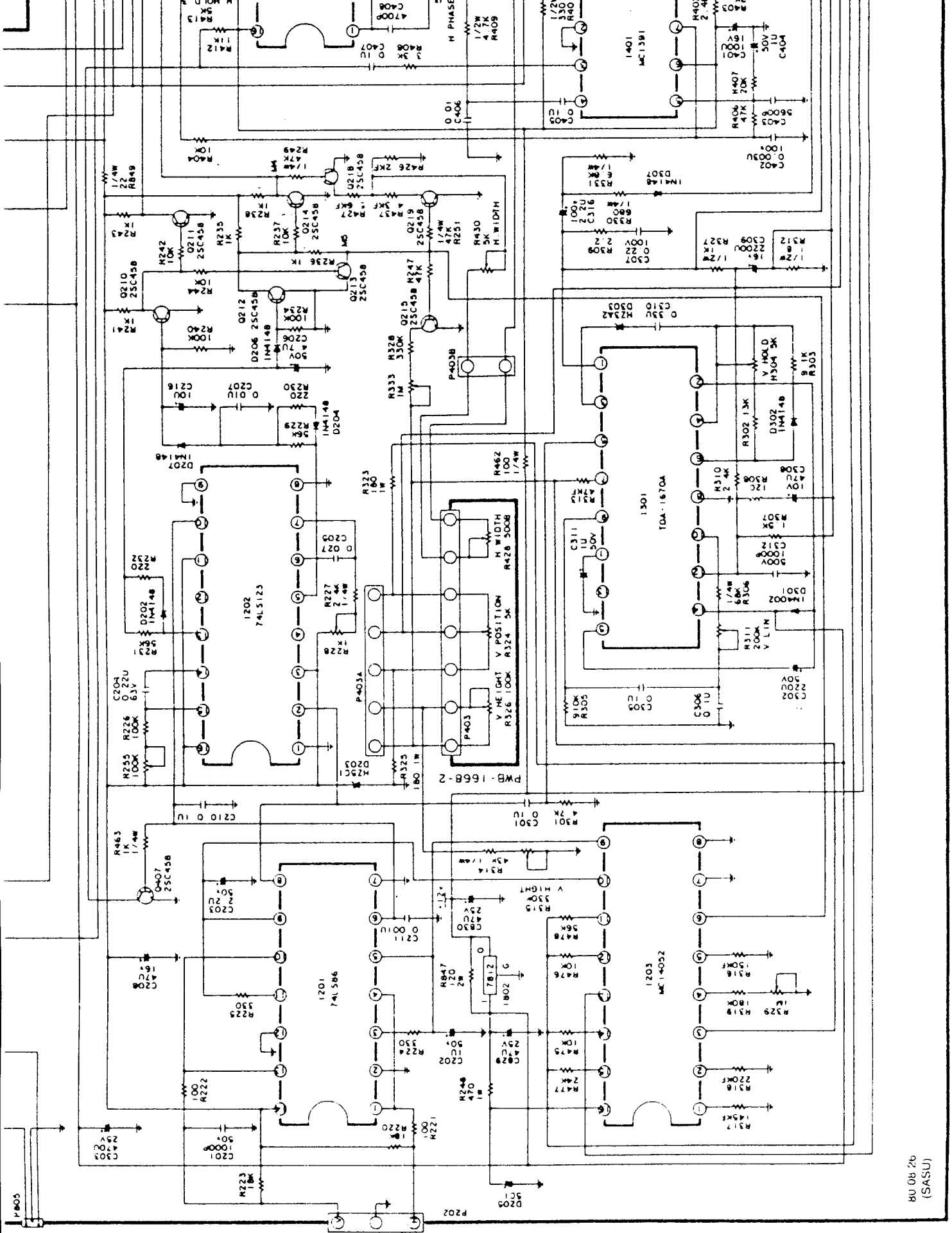
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V HEIGHT R326 100K
V HOLD R304 5K
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V LIN R311 200K
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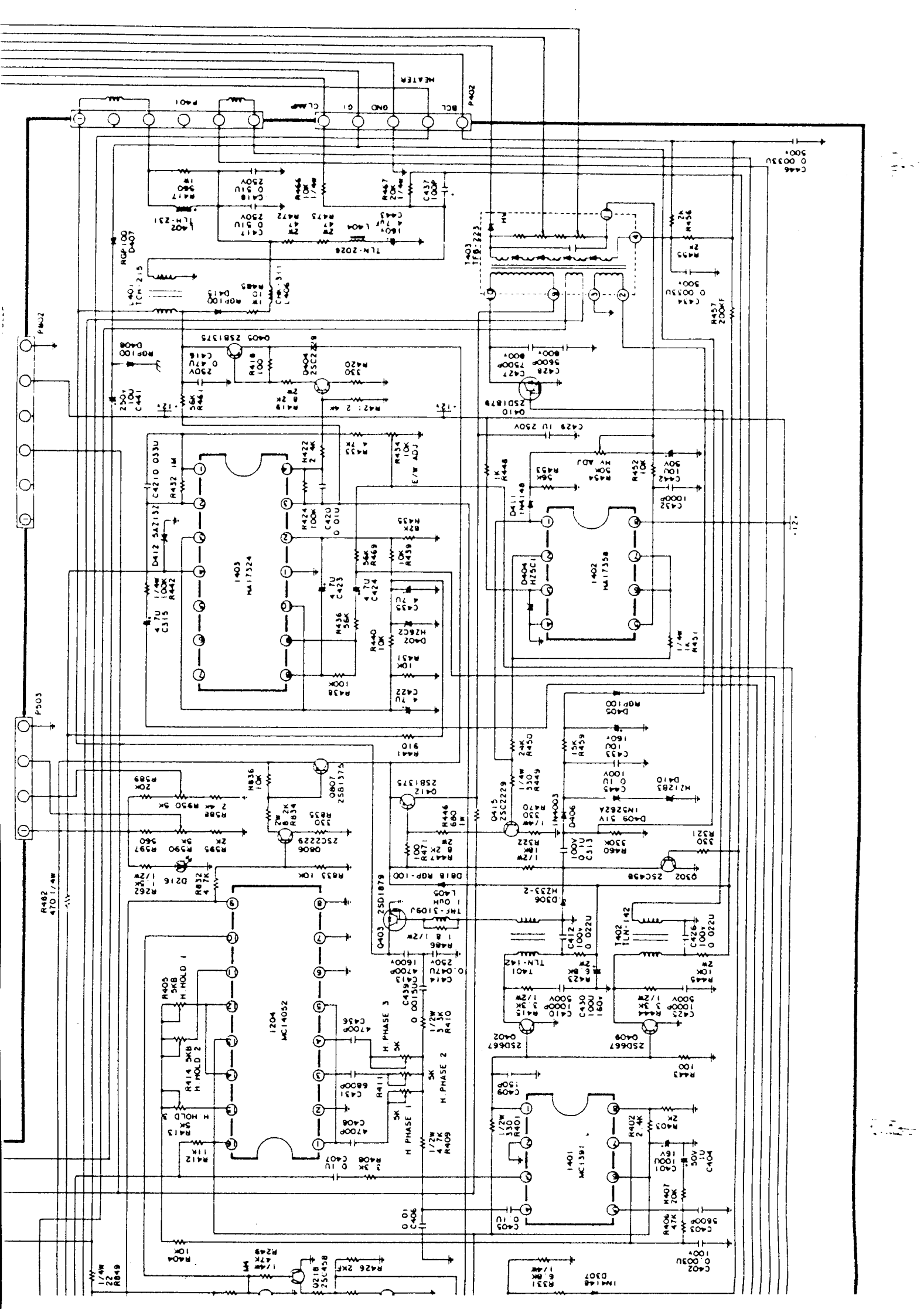

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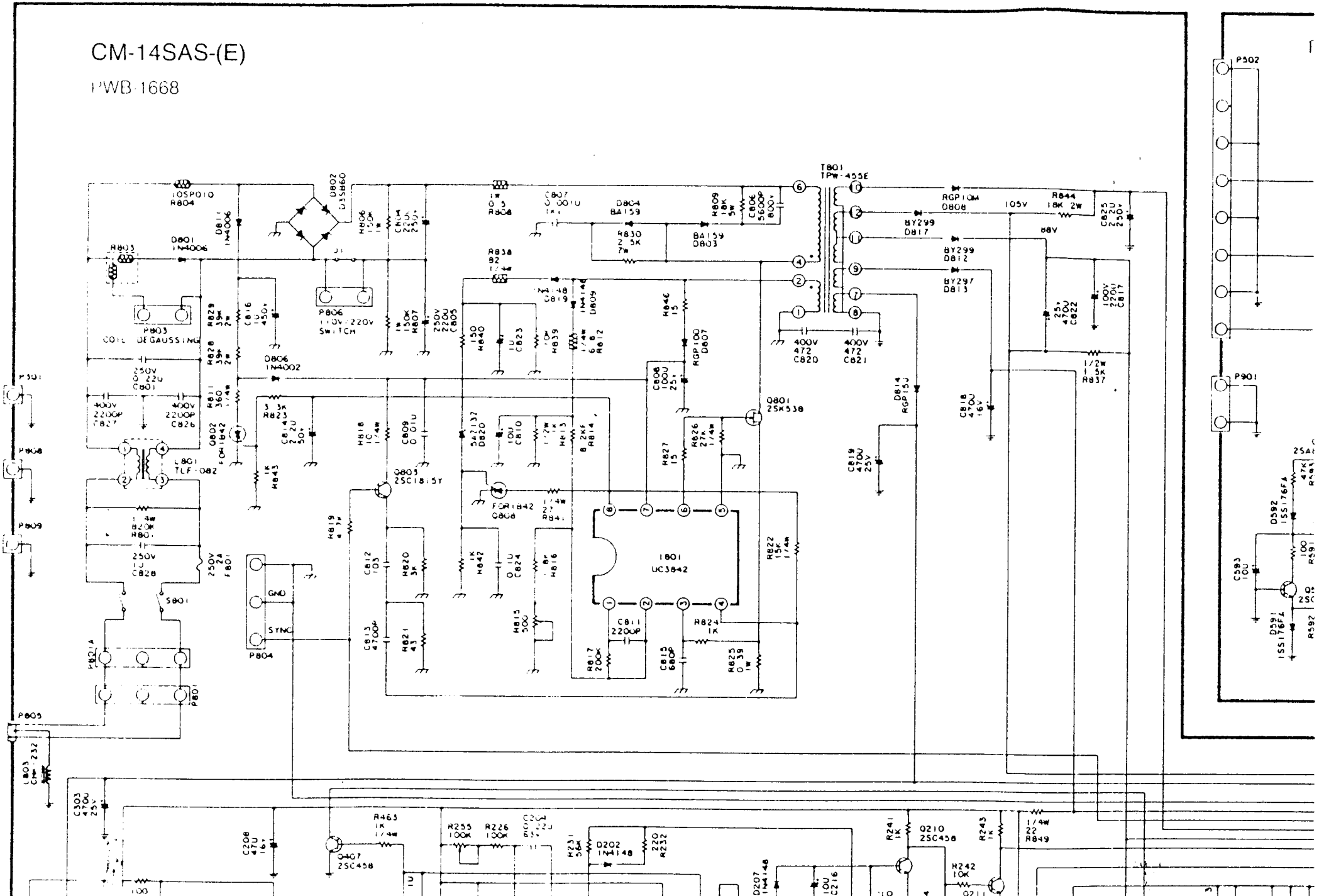
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1/4W
820K
R832
1/4W
820K
R833
1/4W
820K
R834
1/4W
820K
R835
1/4W
820K
R836
1/4W
820K
R837
1/2W
1.5K
R838
82
1/4W
R839
10K
R840
150
R841
27K
1/4W
R842
1K
R843
1K
R844
18K 2W
R845
8.2K
1/4W
R846
15
R847
1/4W
22
R848
1/4W
22
R849
D591
1SS176FA
D592
1SS176FA
C591
10U
C592
10U
C593
10U
R591
R592
R593
R594
R595
R596
R597
R598
R599
R600
R601
R602
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R604
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R615
R616
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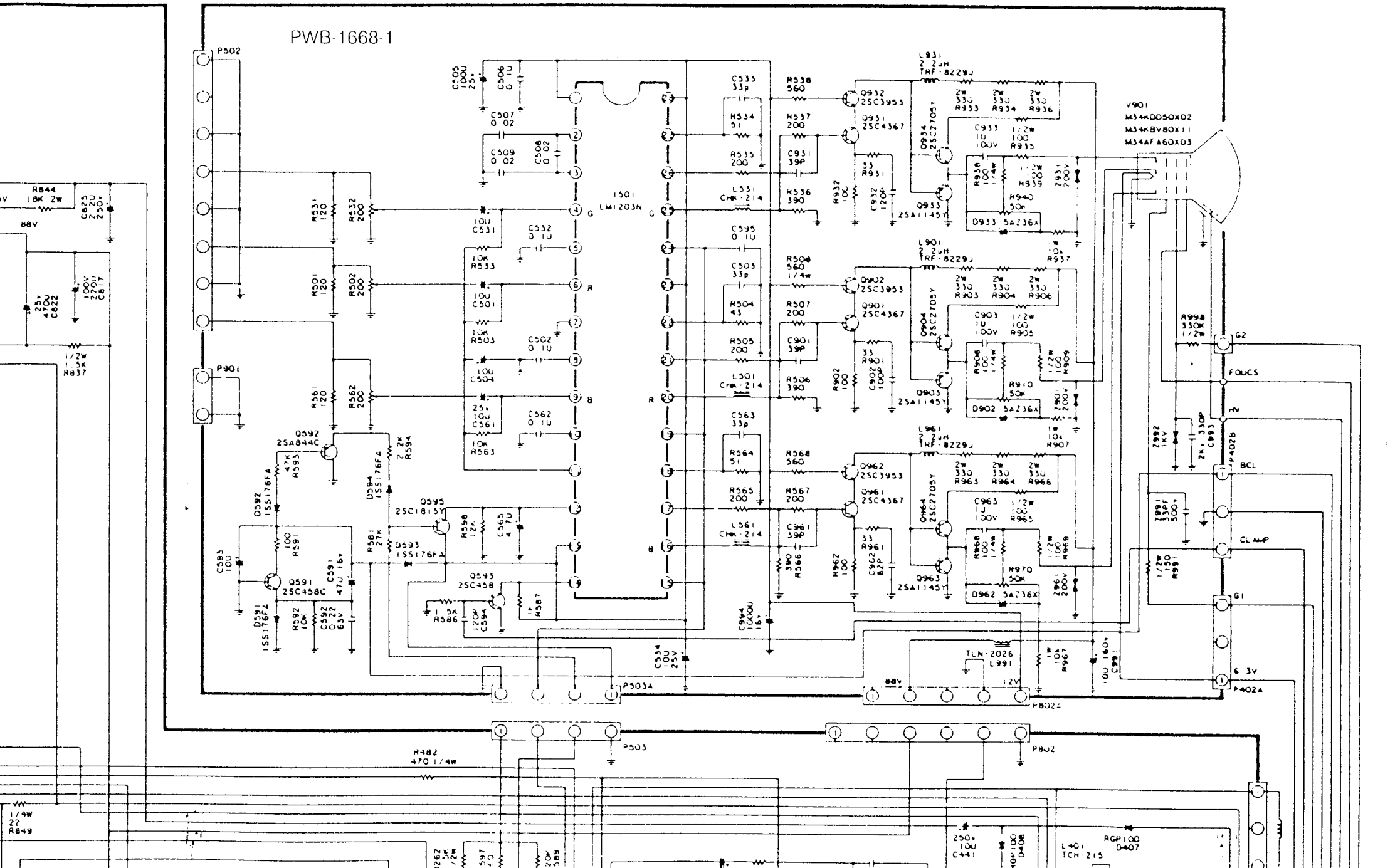
R627
R628
R629
R630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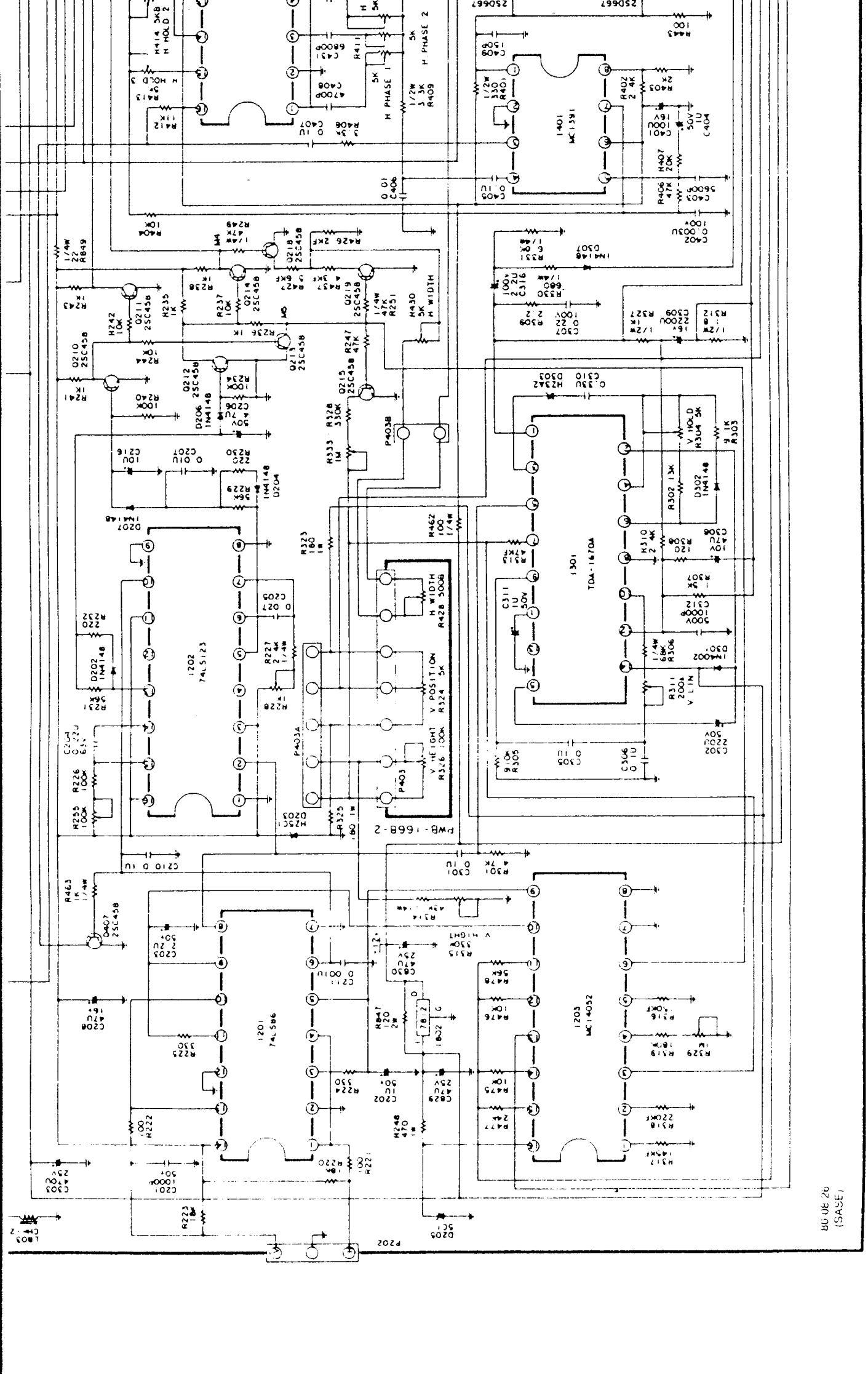
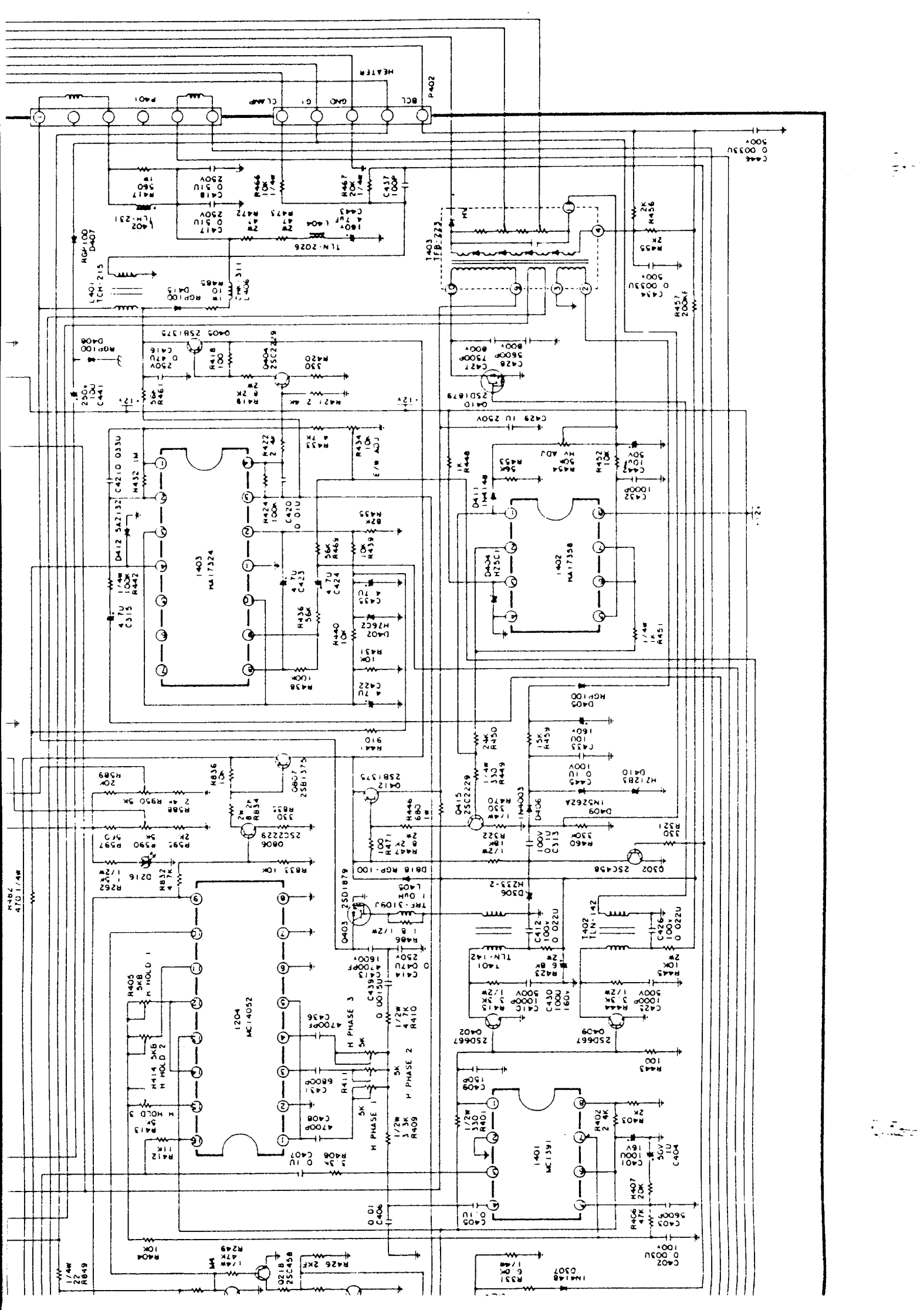
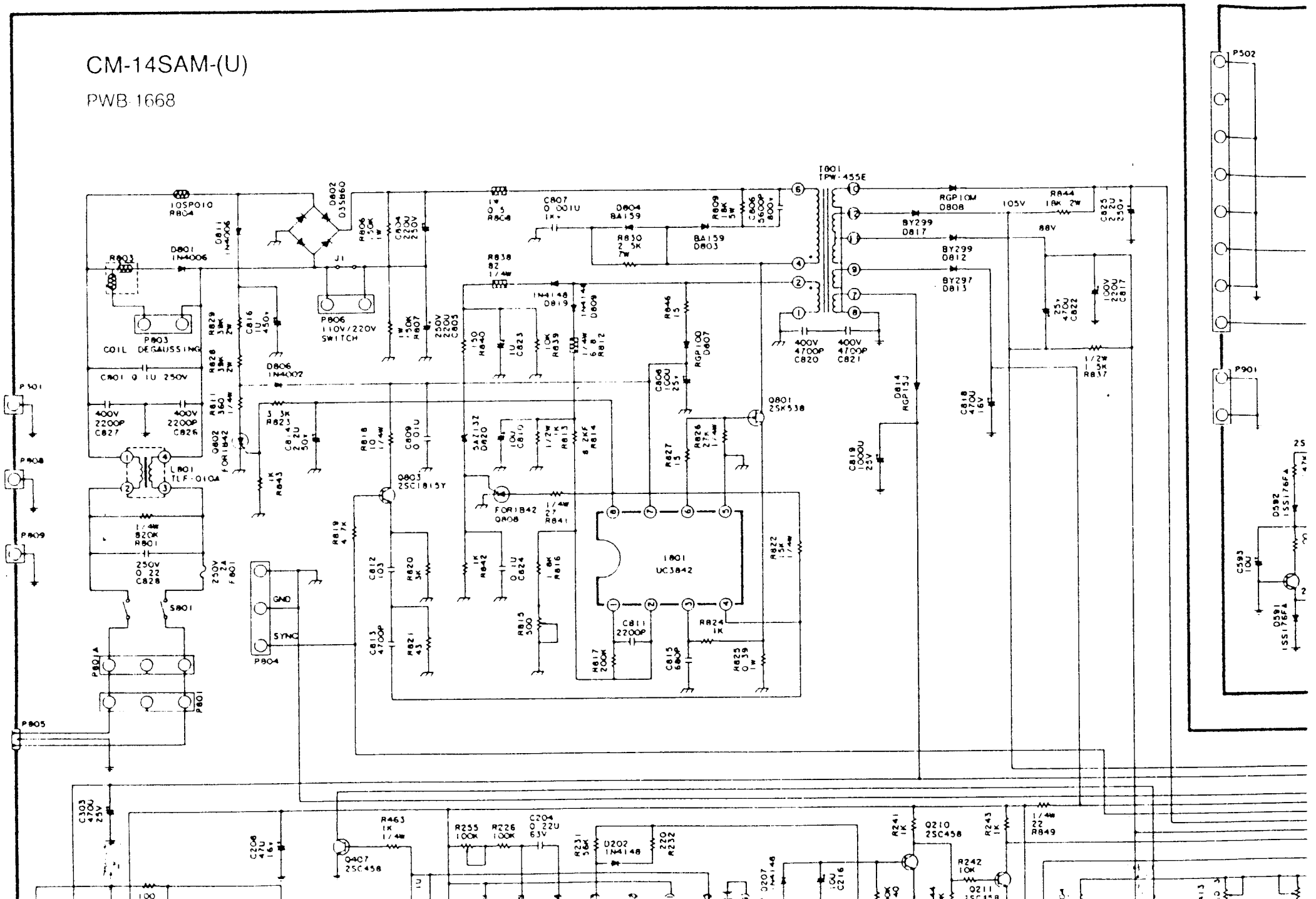
P901
P503A
P503
P802A
P802
P402A
P402B
IC501
LM1203N
V901
M34KDD50X02
M34KBVB0X11
M34AFA60X03
G2
FOCUS
BCL
CLAMP
G1
6.3V
TLN-2026
L991
Q591 2SC458C
Q592 2SA844C
Q593 2SC458
Q595 2SC1815Y
Q901 2SC4367
Q902 2SC3953
Q903 2SA1145Y
Q904 2SC2705Y
Q961 2SC4367
Q962 2SC3953
Q963 2SA1145Y
Q964 2SC2705Y
D901 5A236A
D902 5A236A
D962 5A236X
L401 TCH-215
D407 RGP100

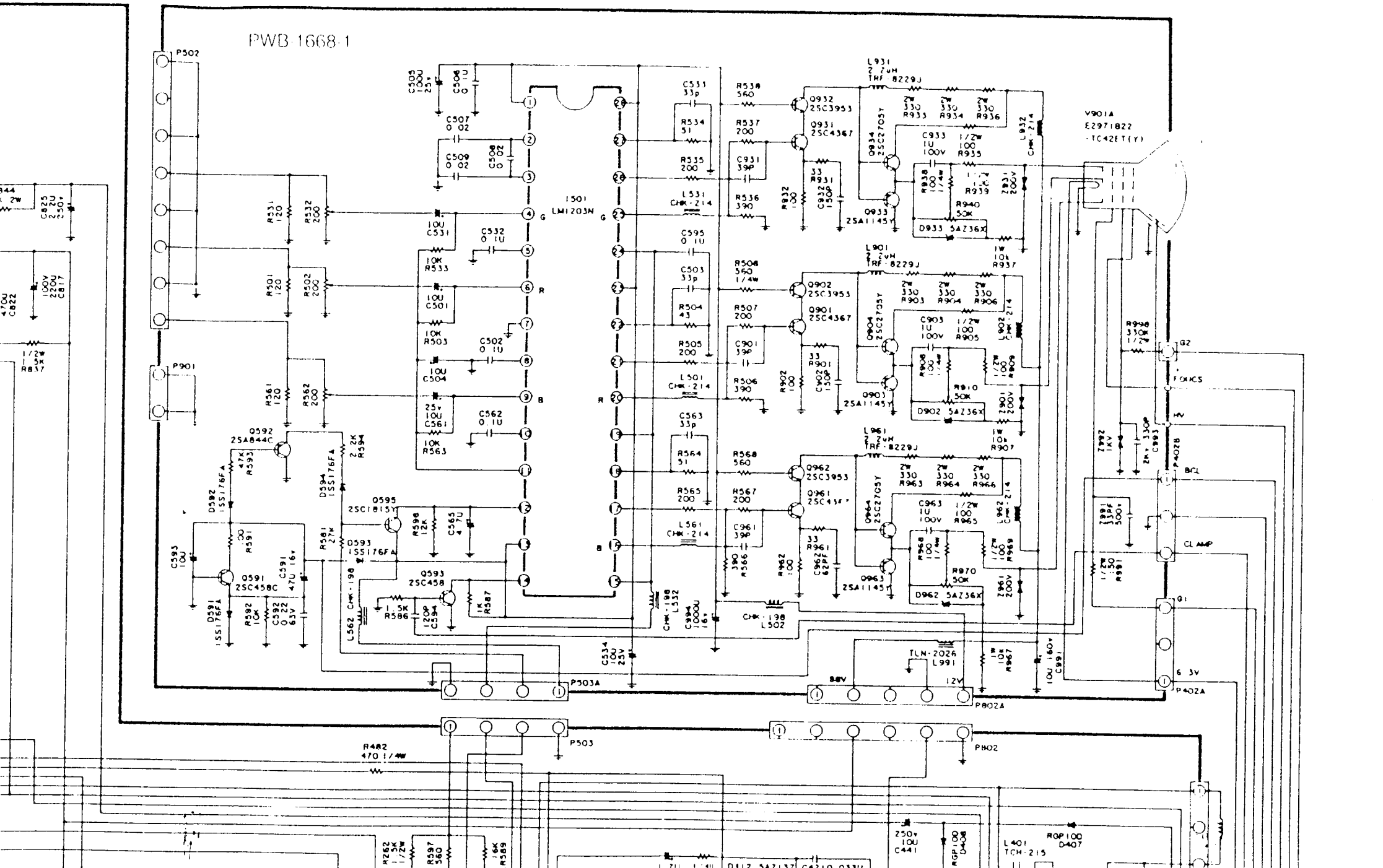

H HOLD 2
H PHASE 2
H PHASE 1
H WIDTH
V HOLD
V POSITION
V HEIGHT
V LIN
V WIDTH
1202
74LS123
1201
74LS86
1203
MC14052
1301
TDA-1670A
1401
MC1391
PWB-1668-2



CM-14SAM-(U)

PWB-1668

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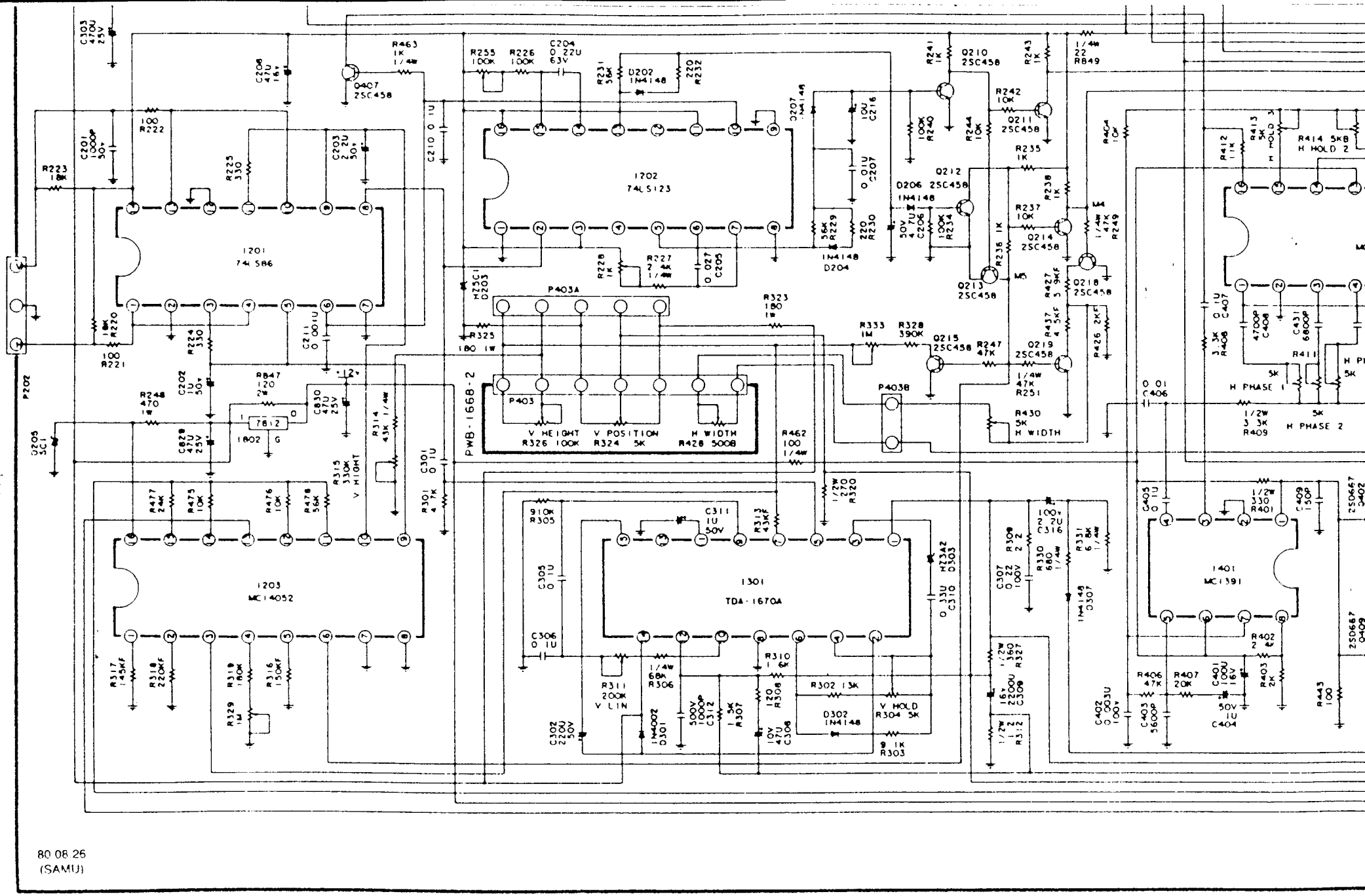
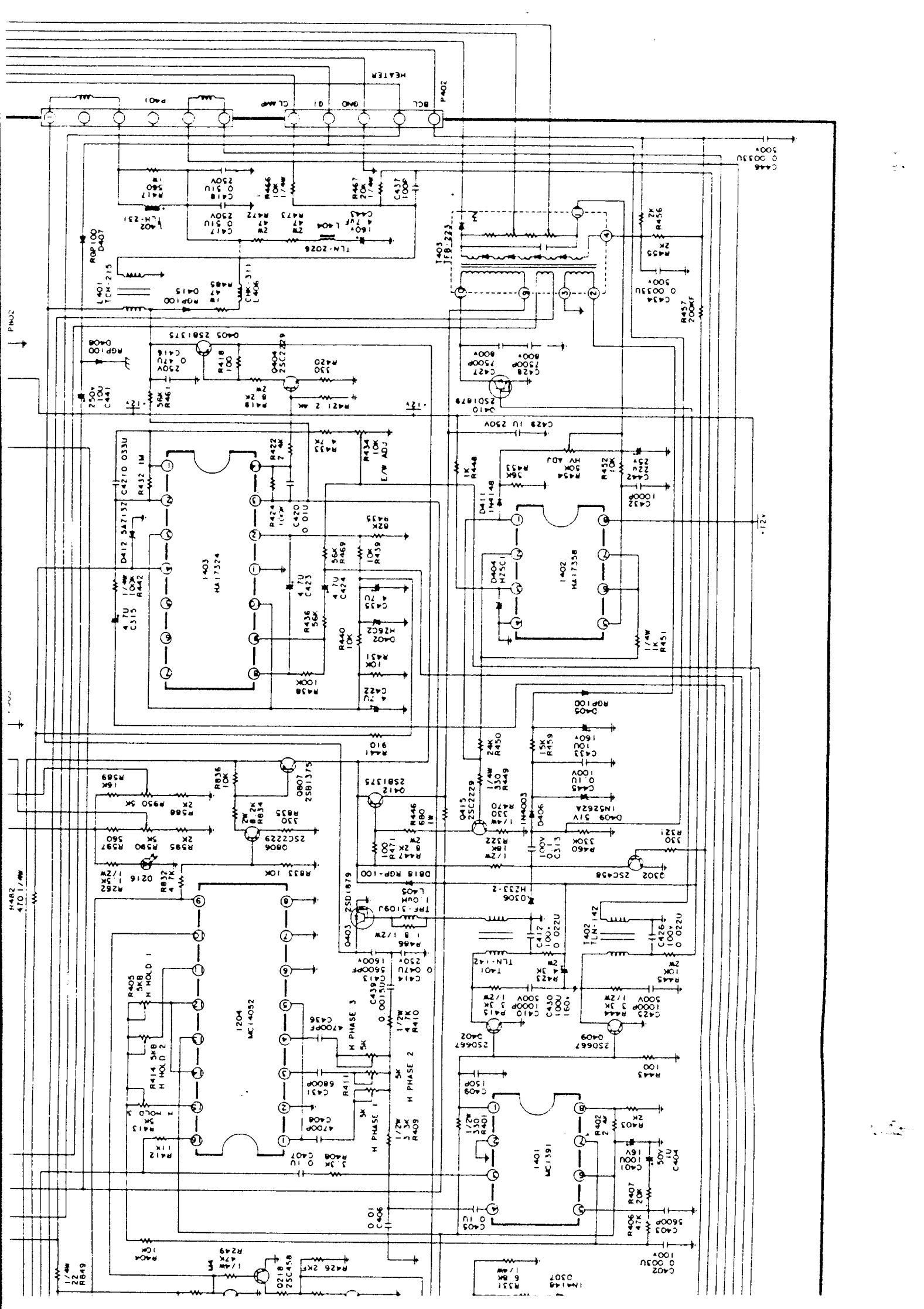
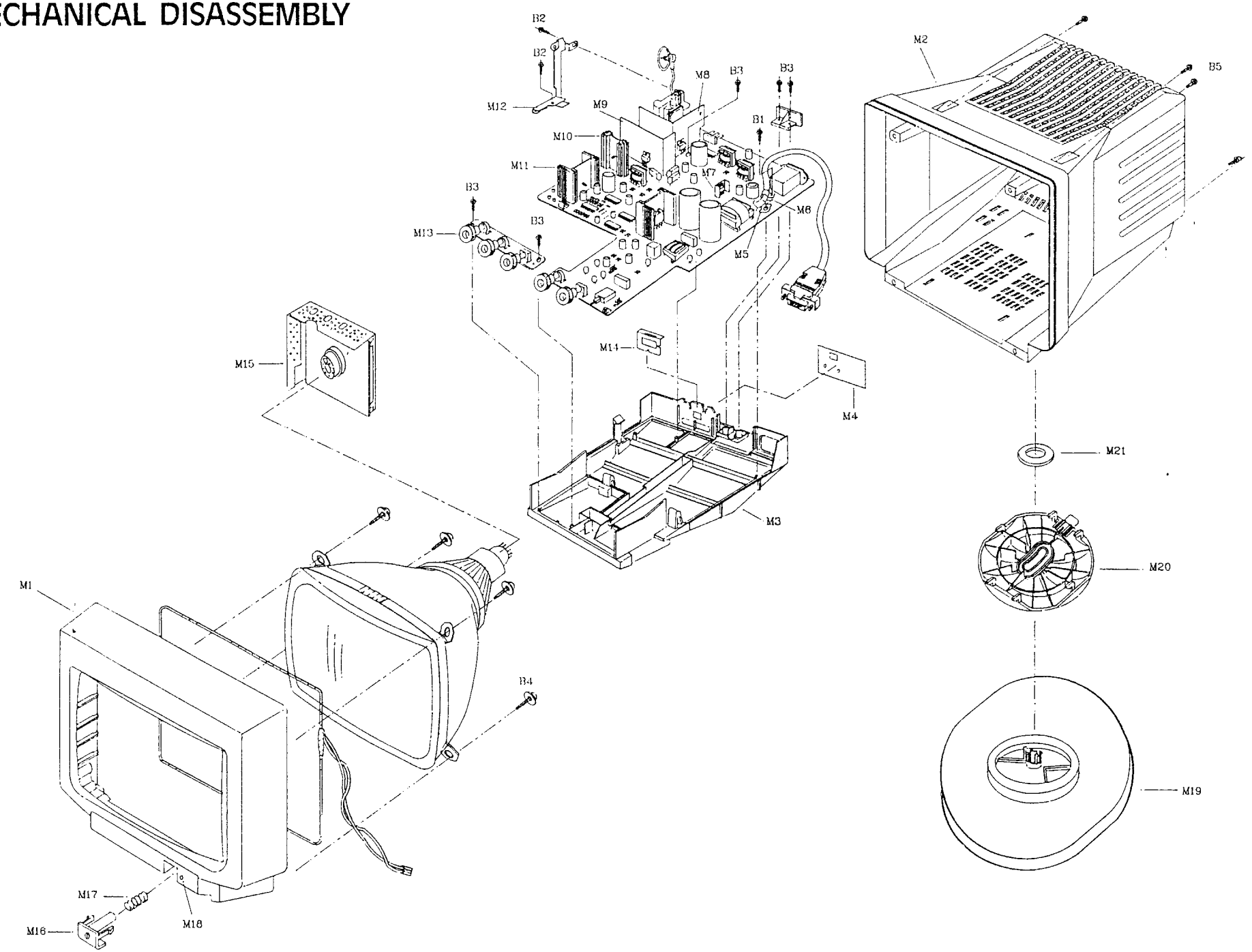
P901
P503A
P503
P802A
P802
P402B
P402A
I501
LM1203N
V901A
E29718Z2
-TC42E7(Y)
Q932 2SC3953
Q931 2SC4367
Q933 2SA1145Y
Q902 2SC3953
Q901 2SC4367
Q903 2SA1145Y
Q962 2SC3953
Q961 2SC4367
Q963 2SA1145Y
Q592 2SA844C
Q595 2SC1815Y
Q591 2SC458C
Q593 2SC458
D933 5AZ36X
D902 5AZ36X
D962 5AZ36X
L931 2.7uH TRF-8229J
L901 2.7uH TRF-8229J
L961 2.7uH TRF-8229J
L531 CHK-214
L501 CHK-214
L561 CHK-214
L562 CHK-198
L532 CHK-198
L502 CHK-198
TLN-2026 L991
L932 CHK-214
L902 CHK-214
L962 CHK-214
L401 TCH-215
G2
FOCUS
H
BCL
CLAMP
G1
6.3V
88V
12V
R482 470 1/4W
RGP100 D407
D404 RGP100


1201
74LS86
1202
74LS123
1203
MC14052
1301
TDA-1670A
1401
MC1391
PWB-1668-2
P403
P403A
P403B
P202
V HEIGHT R326 100K
V POSITION R324 5K
H WIDTH R428 5008
V HOLD R304 5K
V LIN R311 200K
V HEIGHT
H WIDTH R430 5K
H PHASE 1
H PHASE 2
H HOLD 1
H HOLD 2
7812
+12V
80 08 26
(SAMU)



12. MECHANICAL DISASSEMBLY



13. REPLACEMENT PARTS LIST

WARNING: Replacement parts which have special characteristics important to safety should be replaced only with types identical to those in the original circuit or specified in the parts-list. Before replacing any of these components, read carefully the product safety precaution. Do not degrade the safety of the display through improper servicing.

ABBREVIATIONS:

RESISTOR

PART NAME & DESCRIPTION			
TYPE		ALLOWANCE	
CF	Carbon Film	F	± 1%
CC	Carbon Composition	G	± 2%
MOF	Metel Oxide Film	J	± 5%
FU	Fusible	K	± 10%
MF	Metal Film	M	± 20%
VR	Variable Resistor		
CR	Cement Resistor		

CAPACITOR

PART NAME & DESCRIPTION			
TYPE		ALLOWANCE	
CE	Ceramic	F	± 1%
FL	Electrolytic	G	± 2%
PO	Polyester	J	± 5%
TA	Tantalum	K	± 10%
PP	Polypropylene	M	± 20%
ME	Metallized	P	+ 100% - 0%
BL	Barrier layer	Z	+ 80% - 20%

(S) : 0.28mm Pitch CRT
(M) : 0.39mm Pitch CRT
(U) : UL, CSA
(E) : TUV
(C) : Universal

ASSEMBLY PCB-MAIN (PWB-1668)

Sch NO.	Part NO.	Description
CAPACITOR		
C201	5231310291	CE 50V 10000PF K
C202	5213601091	EL 50V 1.0UF M
C203	5213622991	EL 50V 2.2UF M
C204	5275122401	ME 63V 0.22UF J
C205	5221127391	PO 50V 27000PF J
C206	5213647991	EL 50V 4.7UF M
C207	5221110301	PO 50V 10000PF J
C208	5213347091	EL 16V 47UF M
C210	5236310491	BL 50V 0.1UF Z
C211	5231310291	CE 50V 1000PF K
C216	5213610091	EL 50V 10 UF M
C301	5222110491	PO 50V 0.1 UF J
C302	5213622112	EL 50V 220UF M
C303	5214005001	EL 25V 470UF(105°C)
C305	5222610491	PO 50V 0.1UF J (MINI)
C306	5222610491	PO 50V 0.1UF J (MINI)
C307	5222522401	PO 100V 0.22UF K
C308	5213247091	EL 10V 47UF M
C309	5213322212	EL 16V 2200 UF M
C310	5275133401	ME 63V 0.33UF J
C311	5213610191	EL 50V 1.0UF M
C312	5232310291	CE 500V 1000PF K
C313	5271310401	ME 100V 0.1UF M
C315	5213647991	EL 50V 4.7UF M
C316	5214122991	EL 100V 2.2UF M
C401	5213310191	EL 16V 100UF M
C402	5227330291	PO 100V 3000PF J
C403	5221156291	PO 50V 5600PF J
C404	5213601091	PO 50V 1UF M
C405	5221110401	PO 50V 0.1UF J
C406	5221110391	PO 50V 10000PF J
C407	5236310491	BL 50V 0.1UF Z
C408	5221147291	PO 50V 4700PF J
C409	5247015191	CE 50V 150PF J
C410	5222310291	CE 500V 1000PF K
C412	5227322301	PP 100V 22000PF J
C413 (S)	5223747201	PP 1600V 4700PF J
C413 (M)	5223756202	PP 1600V 5600PF J
C414	5223447301	PP 250V 47000PF J
C416	5272147402	ME 250V 0.47UF J
C417	5270351401	ME 250V 0.51UF J
C418	5270351401	ME 250V 0.51UF J
C420	5222110391	PO 50V 10000PF J
C421	5222147391	PO 50V 47000PF J

C422	5213647991	EL	50V 4.7UF M
C423	5213647991	EL	50V 4.7UF M
C424	5213647991	CE	50V 4.7UF M
C425	5232310291	CE	500V 1000PF K
C426	5227322301	PP	100V 22000PF J
C427	5223075201	PP	800V 7500PF J
C428 (U)	5223056201	PP	800V 5600PF J
C428 (M)	5223075201	PP	800V 7500PF J
C429	5272110501	ME	250V 1UF J
C430	5214210112	EL	160V 100UF M
C431	5221168291	PO	50V 6800PF J
C432	5231310291	CE	50V 1000PF K
C433	5214210012	EL	160V10UF M
C434	5232333291	BL	500V 3300PF K
C435	5213647991	EL	50V 4.7UF M
C436	5221147291	PO	50V 4700PF J
C437	5231310191	CE	50V 100PF K
C439	5221115291	PO	50V 1500PF J
C441	5214410012	EL	250V 10UF M
C442 (S)	5213610091	EL	50 10UF M
C442 (M)	5213422091	EL	25V 22UF M
C443	5214247991	EL	160V 4.7UF M
C445	5271310401	ME	100V 0.1UF J
C446	5232333291	CE	500V 3300PF K
C801 (RA) (U)	5270101401	ME	250V 0.1UF M
C801 (RB) (U)	5270102601	ME	250V 0.1UF M
C801 (RA) (E,C)	5270106201	ME	250V 0.1UF M
C801 (RB) (E,C)	5270102701	ME	250V 0.1UF M
C804	5210308000	EL	250V 220UF M (105°C)
C805	5210308000	EL	250V 220UF M (105°C)
C806	5223056201	PP	800V 5600PF J
C807	5233301201	CE	1KV 1000PF K
C808	5213410191	EL	25V 100UF M
C809	5231310391	CE	50V 10000PF K
C810	5213610091	EL	50V 10UF M
C811	5231322291	CE	50V 2200PF K
C812	5231310391	CE	50V 10000PF J
C813	5221147291	PP	50V 4700PF J
C814	5213622991	EL	50V 2.2UF M
C815	5231368191	CE	50V 680PF K
C816	5214701091	EL	450V 1UF M
C817	5216122112	EL	100V 220UF M (105°)
C818	5213003591	EL	16V 470UF M (105°)
C819 (S)	5214005001	EL	25V 470UF M (105°)
C819 (M)	5216005501	EL	25V 1000UF M (105°)
C820	5230102701	CE	400V 4700PF M
C821	5230102701	CE	400V 4700PF M
C822	5213447112	EL	25V 470UF M
C823	5213610191	EL	50V 1.0UPF M

C824	5221110401	PO 50V 0.1UFJ
C825	5214422991	EL 250V 2.2UF M
C826	5230101801	CE 400V 22000PF M
C827	5230101801	CE 400V 2200PF M
C828(U)	5270106201	ME 250V 0.22UFM
C828(E,C)	5270106401	ME 250V 1.0UFM
C829	5213447091	EL 25V 47UFM
C830	5213447091	EL 25V 47UFM
SEMICONDUCTOR		
D202	6613003032	DIODE SWITCHING 1N4148
D203	6615007834	DIODE ZRNRT HZ5C1
D204	6613003032	DIODE SWITCHING 1N4148
D205	6615007834	DIODE ZRNRT HZ5C1
D206	6613003032	DIODE SWITCHING 1N4148
D207	6613003032	DIODE SWITCHING 1N4148
D216	6618010702	DIODE LED
D301	6611007230	DIODE RECTIFIER 1N4002
D302	6613003032	DIODE SWITCHING 1N4148
D303	6615016430	DIODE ZENER HZ3A2
D306 (RA)	6615010933	DIODE ZENER 05AZ36X
D306 (RB)	6615013831	DIODE ZENER HZ33
D307	6613003032	DIODE SWITCHING 1N4148
D402	6615009756	DIODE ZENER HZ6C2
D404	6615007834	DIODE ZENER HZ5C1
D405	6613002234	DIODE SWITCHING RGP10D
D406	6611007330	DIODE SWITCHING 1N4003
D407	6613002234	DIODE SWITCHING RGP10D
D408	6613002234	DIODE SWITCHING RGP10D
D409 (RA)	6615021431	DIODE ZENER 1N5262A
D409 (RB)	6615021430	DIODE ZENER BZX79C51
D410 (S)	6615003736	DIODE ZENER HZ12B3
D411	6613003032	DIODE SWITCHING 1N4148
D412	6615003736	DIODE ZENER HZ12B3
D415	6613002234	DIODE SWITCHING RGP10D
D801	6611007640	DIODE RECTIFIER 1N4006
D802 (RA)	6611028900	DIODE RECTIFIER 03SB60
D802 (RB)	6611024705	DIODE RECTIFIER GBL06L
D803 (RA)	6611011439	DIODE RECTIFIERBA159-T-R
D803 (RB)	6611012834	DIODE RECTIFIER BA159
D804 (RA)	6611011439	DIODE RECTIFIER BA159-R
D804 (RB)	6611012834	DIODE RECTIFIER BA159
D806 (RA)	6611007234	DIODE RECTIFIER 1N4002
D806 (RB)	6611007234	DIODE RECTIFIER 1N4002
D807 (RA)	6613002234	DIODE SWITCHING RGP10D
D807 (RB)	6613002234	DIODE SWITCHING 1N4935
D808	6611012831	DIODE RECTIFIER RGP10M
D809	6613003032	DIODE SWITCHING 1N4148
D811	6611007630	DIODE SWITCHING 1N4006
D812 (RA)	6613003841	DIODE SWITCHING RG3J

D812 (RB)	6613007940	DIODE SWITCHING BY299
D813 (RA)	6613003841	DIODE SWITCHING RG3J
D813 (RB)	6613008040	DIODE SWITCHING BY 297
D814	6611013043	DIODE RECTIFIER RGP15J
D817 (RA)	6613003841	DIODE SWITCHING RG3J
D817 (RB)	6613007940	DIODE SWITCHING BY299
D818	6613002234	DIODE SWITCHING RGP10D
D819	6613003032	DIODE SWITCHING 1N4148
D820	6615010638	DIODE ZENER 05AZ13Z
I201	6646009922	IC HD74LS86
I202	6646007081	IC 74LS123P
I203	6645013302	IC HD14052BP
I204	6645013302	IC HD14052BP
I301	6644045203	IC TDA1675A
I401	6644032900	IC MC1391P
I402	6644073000	IC HA17358
I403	6644042900	IC HA17324
I801	6644063102	IC UC3842AN
I802	6640001800	IC HA17812P
Q210	6621003230	TR 2SC458C
Q211	6621003230	TR 2SC458C
Q212	6621003230	TR 2SC458C
Q213	6621003230	TR 2SC458C
Q214	6621003230	TR 2SC458C
Q215	6621003230	TR 2SC458C
Q218	6621003230	TR 2SC458C
Q219	6621003230	TR 2SC458C
Q302	6621003230	TR 2SC458C
Q402	6622013330	TR 2SD667C
Q403	6622002800	TR 2SD1879
Q404 (RA)	6621014634	TR 2SC2229
Q404 (RB)	6621034430	TR 2SC3467E
Q405 (RA)	6624000500	TR 2SB1375
Q405 (RB)	6624000701	TR 2SB1133
Q407	6621003230	TR 2SC458C
Q409	6622003330	TR 2SD667C
Q410 (BA)	6622002800	TR 2SD1879
Q410 (AA)	6622020880	TR 2SD2125
Q412 (RA)	6624000500	TR 2SB1375
Q412 (RB)	6624000701	TR 2SB1133
Q415 (RA)	6621014634	TR 2SC2229
Q415 (RB)	6621034430	TR 2SC3467E
Q801 (BA)	6626001400	TR 2SK538
Q802 (RB)	6626000300	TR 2SK1461
Q802	6631001731	THYRISTOR SCR SFOR1B42
Q803	6621015332	2SC1815Y
Q806 (RA)	6621014634	TR 2SC2229
Q806 (RB)	6621034430	TR 2SC3467E
Q807 (RA)	6624000500	TR 2SB1375

Q807 (RB)	6624006201	TR 2SB856
Q808	6631001731	THYRISTOR SCR SGOR1B42

COIL AND TRANSFORMER

L401	5062221500	LOIL HOR CHOKEN TCH-215
L402	5062223100	LOIL HOR LINEARITY TLH-231
L404	5062202300	LOIL CHOKE TLN-2026
L405	5064010929	LOIL PEAKING TRF-3109J
L406	5062110300	LOIL CHOKE CHK-311
L801 (U)	5061102202	LOIL FILTER TLF-010A
L801 (E,C)	5061108801	LOIL FILTER TLF-088A
L803 (E)	5062123200	LOIL CHOKE CHK-232
L803 (C)	5062123201	LOIL CHOKE CHK-232A
L401	5062414200	TRANS TLN-142
L402	5062414200	TRANS TLN-142
L403 (RA)	5062622301	TRANS FLYBACK TFB-223A
L403 (RB)	5062622302	TRAND FLYBACK TFB-223B
L403 (RA)	5062622304	TRANS FLYBACK TFB-223D
L403 (RD)	5062622305	TRANS FLYBACK TFB-223E
T801	5061345505	TRANS POWER TPW-455E

RESISTOR

R220	5142118395	CF 1/6W 18K J
R221	5142110195	CF 1/6W 100K J
R223	5142110195	CF 1/6W 100 J
R223	5142118395	CF 1/6W 18K J
R224	5142133195	CF 1/6W 330 J
R225	5142133195	CF 1/6W 330 J
R226	5142133495	CF 1/6W 100 J
R227	5142824295	CF 1/6W 2.4K J
R228	5162161020	VR 1K
R229	5142156395	CF 1/6W 56K J
R230	5142122195	CF 1/6W 220 J
R231	5142156395	CF 1/6W 56K J
R232	5142122195	CF 1/6W 220 J
R234	5142110495	CF 1/6W 100K J
R235	5142110295	CF 1/6W 1K J
R236	5142110295	CF 1/6W 1K J
R237	5142110395	CF 1/6W 10K J
R238	5142110295	CF 1/6W 1K J
R240	5142110495	CF 1/6W 100K J
R241	5142110295	CF 1/6W 1K J
R242	5142110395	CF 1/6W 10K J
R243	5142110295	CF 1/6W 1K J
R244	5142147395	CF 1/6W 10K J
R247	5142147395	CF 1/6W 47K J
R248	5130347103	MOF 1W 470 J
R249	1542847395	CF 1/4W 47K J
R251	5142847395	CF 1/4W 47K J

R255	5162162820	VR 100K
E262	5142515290	CF 1/2W 1.5KJ
R301	5142147295	CF 1/6W 4.7K J
R302	5142113395	CF 1/6W 13K J
R303	5142191295	CF 1/6W 9.1K J
R304	5162161720	VR 5K
R305	5142191495	CF 1/6W 910K J
R306	5142868395	CF 1/4W 68K J
R307	5142115295	CF 1/6W 1.5K J
R308	5142115295	CF 1/6W 120 J
R309	5142122995	CF A/6W 2.2 J
R310(S)	5142124295	CF 1/6W 2.4K J
R310(M)	5142116295	CF 1/6W 1.6K J
R311	5162163020	VR 200K
R312(S)	5142518990	CF 1/2W 1.8 J
R312(M)	5142412990	CF 1/2W 1.2 J
E313(S)	5134747028	MF 1/6W 47K F
R313(M)	5134753028	MF 1/6W 43K F
R314	5142843395	CF 1/4W 43K J
R315	5162163320	VR 330K
R316	5134715038	MF 1/6W 150K F
R317	5134714538	MF 1/6W 145K F
R318	5134722038	MF 1/6W 220K F
R319	5142118495	CF 1/6W 180K J
R321	5142133195	CF 1/6W 330 J
R322	5130311307	MOF 1W 11K J
R323	5130318103	MOF 1W 180 J
R325	5130318103	MOF 1W 180 J
R327(S)	5142410290	CF 1/2W 1K J
R327(M)	5142436190	CF 1/2W 360 J
R328	5142133495	CF 1/6W 330K J
R329	5162163720	VR 1M
R330	5142868195	CF 1/4W 680 J
R331	5142868295	CF 1/4W 6.8K J
R333	5162163720	VR 1M
R401	5142533190	CF 1/2W 330 J
R402	5142124295	CF 1/6W 2.4K J
R403	5142120295	CF 1/6W 2K J
R404	5142111395	CF 1/6W 11K J
R405	5162161750	VR 5K
R406	5142147395	CF 1/6W 47K J
R407	5142120395	CF 1/6W 20K J
R408	5142133295	CF 1/6W 3.3K J
R409	5142433290	CF 1/2W 3.3K J
R410	5142447290	CF 1/2W 4.7K J
R411	5160103317	VR 5K-3R
R412	5142140395	CF 1/6W 10K J
R413	5162171771	VR 5K
R414	5162161750	VR 5K

R415	5142433290	VF 1/2W 3.3K J
R417	5130356103	MOF 1W 560 J
R418	5142110195	CF 1/6W 100J
R419	5130482203	MOF 2W 8.2K J
R420	5142133195	CF 1/6W 330 J
R421	5142124295	CF 1/4W 2.4K J
R422	5142124295	CF 1/4W 2.4K J
R423(S)	5130468203	MOF 2W 6.8K J
R423(M)	5130443203	MOF 2W 4.3K J
R424	5142110495	CF 1/6W 100K J
R426	5142120295	CF 1/6W 2K J
R426	5142120295	CF 1/6W 2K J
R427(S)	5134756018	MOF 1/6W 5.6K F
R427(M)	5134759018	MOF 1/6W 5.9K F
R430	5162161720	VR 5K
R431	5142110395	CF 1/6W 10K J
R432	5142110595	CF 1/6W 1M J
R433	5142147295	CF 1/6W 4.7K J
R434	5162161920	VR 10K
R435	5142182395	CF 1/6W 82K J
R436	5142156395	CF 1/6W 56K J
R437(S)	5134743018	MOF 1/6W 4.3K F
R437(M)	5134745018	MOF 1/6W 4.5K F
R438	5142110495	CF 1/6W 100K J
R439	5142110395	CF 1/6W 10K J
R440	5142110395	CF 1/6W 10K J
R441	5142191195	CF 1/6W 910 J
R442	5142810495	CF 1/4W 100K J
R443	5142110195	CF 1/6W 100 J
R444	5142433290	CF 1/2W 3.3K
R445	5130410303	MOF 2W 10K J
R446	5130368103	MOF 1W 680 J
R447	5130482203	MOF 2W 8.2K J
R448	5142110295	CF 1/6W 1K J
R449	5142833195	CF 1/4W 330 J
R450	5145124395	CF 1/6W 24K J
R451	5142810295	CF 1/4W 1K J
R452	5142110395	CF 1/6W 10K J
R453	5142156395	CF 1/6W 56K J
R454	5162162620	VR 50K
R455	5142120295	CF 1/6W 2K J
R456	5142120295	CF 1/6W 2K J
R457	5135720038	MOF 1/6W 200K F
R459	5142115395	CF 1/6W 15K J
R460	5142133495	CF 1/6W 330K J
R461	5142156395	CF 1/6W 56K J
R462	5142810195	CF 1/4W 100 J
R463	5142810295	CF 1/4W 1K J
R466	5142810396	CF 1/4W 10K J

R467	5142820395	CF 1/4W 20K J
R469	5142156395	CF 1/6W 56K J
R470	5142833195	CF 1/4W 330 J
R471	5142110195	CF 1/6W 100 J
R472	5130447003	MOF 2W 47 J
R473	5130447003	MOF 2W 47 J
R475	5142110395	CF 1/6W 10K J
R476	5142110395	CF 1/6W 10K J
R477	5142124395	CF 1/6W 24K J
R478	5142156395	CF 1/6W 56K J
R482	5142847195	CF 1/4W 470 J
R485(S)	5130310003	MOF 1W 10J
R485(M)	5130347003	MOF 1W 47 J
R486	5142418990	CF 1/2W 1.8 J
R801	5142882495	CF 1/4W 820K J
R803	5101106900	POSISTOR
R804	5101108400	THERMISTOR
R806	5130315403	MOF 1W 150K J
R807	5130315403	MOF 1W 150K J
R808	5133250803	FU 14A/1W 0.5 J
R809	5154418325	CR 5W 18K J
R811	5142836195	CF 1/4W 360 J
R812	5133868903	FU 14A 1/4W 6.8 J
R813	5142410290	CF 1/2W 1K J
R814	5134782018	MF 1/6W 8.2K F
R815	5142140820	VR 500
R816	5142118295	CF 1/6W 1.8K J
R817	5142120495	CF 1/6W 200K J
R818	5142810095	CF 1/4W 10 J
R819	5142147295	CF 1/6W 4.7K J
R820	5142130295	CF 1/6W 3K J
R821	5142143095	CF 1/6W 43 J
R822	5142815395	CF 1/4W 15K J
R823	5142133295	CF 1/6W 3.3K J
R824	5142110295	CF 1/6W 1K J
R825	5130339803	MOF 1W 0.39 J
R826	5142827295	CF 1/4W 27K J
R827	5142115095	CF 1/6W 15 J
R828	5130439303	MOF 2W 39K J
R829	5130439303	MOF 2W 39K J
R830	5154525225	CR 7W 2.5K J
R832	5142147295	CF 1/6W 4.7K
R833	5142110395	CF 1/6W 10K J
R834	5130482203	MOF 2W 8.2K
R835	5142133195	CF 1/6W 330 J
R836	5142110395	CF 1/6W 10K J
R837	5142415290	CF 1/2W 1.5K J
R838	5133882003	FU 14A 1/4W 82 J
R839	5142110395	CF 1/6W 10K J

R840	5142115195	CF 1/6W 150 J
R841	5142827095	CF 1/4W 27 J
R842	5142110295	CF 1/6W 1K J
R843	5142110295	CF 1/6W 1K J
R844	5130418303	MOF 2W 18K J
R846	5142115095	CF 1/6W 15 J
R847	5130412103	MOF 2W 120 J
R849	5142822095	CF 1/4W 22 J

ASSEMBLY PCB-CRT (PWB-1668-1)

Sch NO.	Part NO.	Description
CAPACITOR		
C501	5213610091	EL 50V 10UF M
C502	5236310491	BL 50V 0,1UF Z
C503	5247033091	CE 50V 33PF J
C504	5213610091	EL 50V 10UF M
C505	5213410191	EL 25V 100UF M
C506	5236310491	BL 50V 0.1UF Z
C507	5231820391	CE 50V 20000PF Z
C508	5231820391	CE 50V 20000PF Z
C809	5231820391	CE 50V 20000PF Z
C531	5213610091	EL 50V 10UF M
C532	5236310491	BL 50V 0.1UF M
C533	5247033091	CE 50V 33PF J
C534	5213610091	EL 50V 10UF M
C561	5213610091	EL 50V 10UF M
C562	5236310491	BL 50V 0.1UF Z
C563	5247033091	CE 50V 33PF J
C565	5213647991	EL 50V 4.7UF M
C591	5213347091	EL 16V 47UF M
C592	5275122401	ME 63V 0.22UF J
C593	5213610095	EL 50V 10UF M
C594	5249012191	CE 50V 120PF K
C595	5236310491	BL 50V 0.1UF Z
C901	5247039091	CE 50V 39PF J
C902(S)	5247010191	CE 50V 100PF J
C902(M)	5247015191	CE 50V 150PF J
C903	5271110501	ME 100V 1UF J
C931	5247039091	CE 50V 39PF J
C932(S)	5247012191	CE 50V 120PF J
C932(M)	5247015191	CE 50V 150PF J
C933	5271110501	ME 100V 1UF J
C961	5247039091	CE 50V 39PF J
C962(S)	5237082091	CE 50V 82PF J
C962(M)	5247062091	CE 50V 62PF J

C963	5271110501	ME 100V 1UF J
C991	5214210012	EL 160 10UF M
C993	5234333101	CE 2KV 330PF K
C994	5213310212	EL 16V 1000UF M
COIL		
L501(U,C)	5062121400	COIL CHOKE CHK-214
L502(U,C)	5062119800	COIL CHOKE CHK-198
L531(U,C)	5062121400	COIL CHOKE CHK-214
K532(U,C)	5062119800	COIL CHOKE CHK-198
L561(U,C)	5062121400	COIL CHOKE CHK-214
L562(U,C)	5062119800	COIL CHOKE CHK-198
L901	5064422925	COIL PEAKING TRF-8229J
L902	5062121400	COIL CHOKE CHK-214
L931	5064422925	COIL PEAKING TRF-8229J
L932	5062121400	COIL CHOKE CHK-214
L961	5064422925	COIL PEAKING TRF-8229J
L962	5062121400	COIL CHOKE CHK-214
L991	5062202300	COIL CHOKE TLN-2026
SEMICONDUCTOR		
D591	6613003032	DIODE SWITCHING 1N4148
D592	6613003032	DIODE SWITCHING 1N4148
D593	6613003032	DIODE SWITCHING 1N4148
D594	6613003032	DIODE SWITCHING 1N4148
D902(RA)	6615010933	DIODE ZENER 05AZ36X
D902(RB)	6615013831	DIODE ZENER HZ33
D932(RA)	6615010933	DIODE ZENER 05AZ36X
D932(RB)	6615013831	DIODE ZENER HZ33
D962(RA)	6615010933	DIODE ZENER 05AZ36X
D962(RB)	6615013831	DIODE ZENER HZ33
I501	6644069400	IC LM1203N
Q591	6621003230	TR 2SC458C
Q592	5523001130	TR 2SA844C
Q593	6621003230	TR 2SC458C
Q595(RA)	6621015334	TR 2SC1815
Q595(RB)	6621015332	TR 2SC1815Y
Q901	6621036330	TR 2SC4367
Q902(AA)	6621003400	TR 2SC3953
Q902(BA)	6621006300	TR 2SC4439
Q903(AA)	6624010630	TR 2SB716AD
Q903(BA)	6623008500	TR 2SA1145Y
Q904(AB)	6622018430	TR 2SD756AD
Q904(BB)	6621025800	TR 2SC2705Y
Q931	6621036330	TR 2SC4367
Q932(AC)	6621003400	TR 2SC3953
Q932(BB)	6621006300	TR 2SC4439
Q933(AA)	6624010530	TR 2SB716AD
Q933(BA)	6623008500	TR 2SA1145Y

Q934(AB)	6622018430	TR 2SD756AD
Q934(BB)	6621025800	TR 2SC2705Y
Q961	6621036330	TR 2SC4367
Q962(AE)	6621003400	TR 2SC3953
Q962(BC)	6621006300	TR 2SC4439
Q963(AA)	6624010530	TR 2SB716AD
Q963(BA)	6623008500	TR 2SA1145Y
Q964(AB)	6622018430	TR 2SD756AD
Q964(BB)	6621025800	TR 2SC2705Y

RESISTOR

R501	5142112195	CF 1/6W 120 J
R502	5162160380	VR 200
R503	5142110395	CF 1/6W 10K J
R504	5142143095	CF 1/6W 43 J
R505	5142120195	CF 1/6W 200 J
R506	5142139195	CF 1/6W 390 J
R507	5142120195	CF 1/6W 200 J
R508	5142156195	CF 1/6W 560 J
R531	5142112195	CF 1/6W 120 J
R532	5162160380	VR 200
R533	5142110395	CF 1/6W 10K J
R534	5142151095	CF 1/6W 51 J
R535	5142120195	CF 1/6W 200 J
R536	5142139195	CF 1/6W 390 J
R537	5142120195	CF 1/6W 200 J
R538	5142125195	CF 1/6W 560 J
R561	5142112195	CF 1/6W 120 J
R562	5162160380	VR 200
R563	5142110395	CF 1/6W 10K J
R564	5142151095	CF 1/6W 51 J
R565	5142120195	CF 1/6W 200 J
R566	5142139195	CF 1/6W 390 J
R567	5142120195	CF 1/6W 200 J
R568	5142156195	CF 1/6W 560 J
R581	5142127395	CF 1/6W 27K J
R586	5142115295	CF 1/6W 1.5K J
R587	5142110295	CF 1/6W 1K J
R588(S)	5142124295	CF 1/6W 2.4K J
R588(M)	5142120295	CF 1/6W 2.0K J
R589(S)	5142120395	CF 1/6W 20K J
R589(M)	5142116395	CF 1/6W 16K J
R590	5160810217	VR 5K
R591	5142110195	CF 1/6W 100 J
R592	5142110395	CF 1/6W 10K J
R593	5142147395	CF 1/6W 47K J
R594	5142122295	CF 1/6W 2.2K J
R595	5142120295	CF 1/6W 2K J
R597	5142156195	CF 1/6W 560 J

R598	5142112395	CF 1/6W 12K J
R901	5142133095	CF 1/6W 33 J
R902	5142110195	CF 1/6W 100 J
R903	5130433103	MOF 2W 330 J
R904	5130433103	MOF 2W 330 J
R905	5142410190	CF 1/2W 100 J
R906	5130433103	MOF 2W 330 J
R907	5130310307	MOF 1W 10K
R908	5142810195	CF 1/4W 100 J
R909	5111210190	CC 1/2W 100 J
R910	5162162650	VR 50K
R931	5142133095	CF 1/6W 33 J
R932	5142110195	CF 1/6W 100 J
R933	5130433103	MOF 2W 330 J
R934	5130433103	MOF 2W 330 J
R935	5142410190	CF 1/2W 100 J
R936	5130433103	MOF 2W 330 J
R937	5130310307	MOF 1W 10K J
R938	5142810195	CF 1/4W 100 J
R939	5111210190	CC 1/2W 100 J
R940	5162162650	VR 50K
R950	5162087867	VR 5K
R961	5142133095	CF 1/6W 33 J
R962	5142110195	CF 1/6W 100 J
R963	5130433103	MOF 2W 330 J
R964	5130433103	MOF 2W 330 J
R965	5142410190	CF 1/2W 100 J
R966	5130433103	MOF 2W 330 J
R967	5130310307	MOF 1W 10K J
R968	5142810195	CF 1/4W 100J
R969	5111210190	CC 1/2W 100 J
R970	5162162650	VR 50K
R991	5142415190	CF 1/2W 150 J
R998	5111233490	CC 1/2W 330K J
Z901	5202201991	SPARK GAP DSP-201M 200V 1PF
Z931	5202201991	SPARK GAP DSP-201M 200V 1PF
Z961	5202201991	SPARK GAP DSP-201M 200V 1PF
Z991	5247333091	CE 500V 33PF J
Z992	5202200501	SPARK GAP SG05G 1KV 1PF

ASSEMBLY PCB-CONTROL (PWB-1668-2)

Sch NO.	Part NO.	Description
R324	5160810217	VR 0.15W 5K
R326	5160807878	VR 100K
R428	5160807858	VR 500

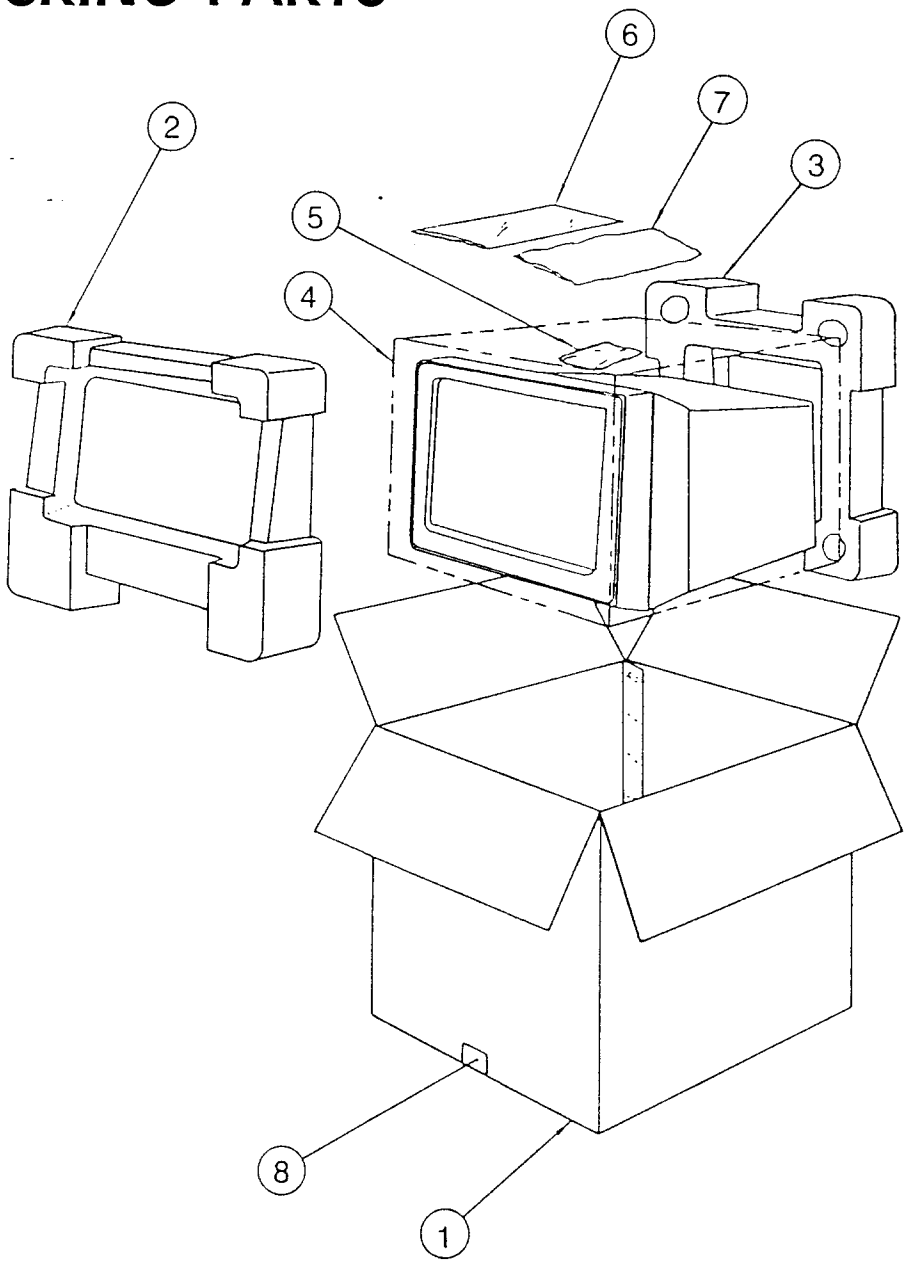
ASSEMBLY CRT

Sch NO.	Part NO.	Description
L991	5060114410	DEGAUSSING COIL TSB-144J
V901(AA)(S)	5051226400	CCRT M34KBV80X11 (PANASONIC)
V901(BA)(S)	5051226400	CCRT M34KDD50X02 (HITACHI)
V901(CA)(S)	5051226406	CCRT M34AFA60X03 (CPT)
V901(M)(U)	5051228000	CCRT E2971B22-TC42ET (CPT)
V901(M)(E,C)	5051228010	CCRT E2971B22-TC42ETHT(CPT)

OTHERS

Sch NO.	Part NO.	Description
F801	5054420031	FUSE 250V 2A
P505	5057409202	SINGAL CABLE

14. PACKING PARTS



NO.	PART NO.	DESCRIPION
1		PACKING CARTON
8	9560137612	OPP TAPE
7	9554100400	PE BAG FOR POWER CORD
6	9554141000	PE BAG FOR INSTRUCTIONS MANUAL
5	8802019083	DRIER SILICA GEL
4	9553172119	PE BAG FOR UNIT
3	9521380456	EPS (BACK)
2	9521380356	EPS (FRONT)

1. PRECAUTIONS AND NOTICES

1-1. SAFETY PRECAUTIONS

<1> Observe all cautions and safety related notes located inside the display cabinet and on the display chassis.

<2> Operation of these displays outside the cabinet or with the cover removed, involves a shock hazard from the display power supplies. Work on the display should not be attempted by anyone who is not thoroughly familiar with precautions necessary when working on high voltage equipment.

<3> Do not install, remove or handle the picture tube in any manner unless shatter-proof goggles are worn. People not so equipped should be kept away while handling picture tube. Keep picture tube away from the body while handling.

<4> The picture tube is constructed to limit X-RADIATION to 0.5mR/HR at 300 microamperes anode current. For continued protection, use the recommended replacement tube only, and adjust the voltages so that the designated maximum rating at the anode will not be exceeded.

<5> Before returning a serviced display to the customer, a thorough safety test must be performed to verify that the display is safe to operate without danger or shock. Always perform an AC leakage current check on the exposed metallic parts of the cabinet. Proceed as follows:

Connect the monitor power lead to the mains supply, via an isolation transformer, and switch on. Using the test circuit shown in Fig. 1-1, measure the AC leakage current between each pole (L and N of the supply and all accessible metal parts. The earth leakage current must not exceed 3.5mA.

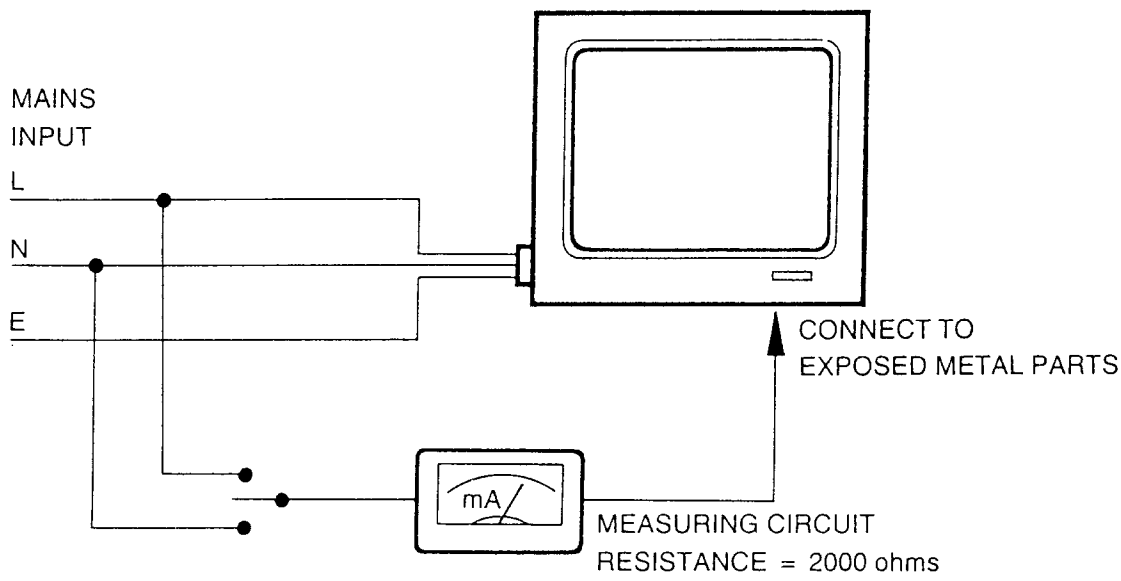


Fig 1-1 AC LEAKAGE CURRENT TEST CIRCUIT

1-2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis provide special visual safety protection. The protection afforded by them cannot necessarily be obtinbed by using replacement components rated for higher voltage, wattage, etc.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire, X-RAY radiation or other hazards.

1-3. SERVICE NOTES

<1> When replacing parts or circuit boards, wrap the wires around terminals before soldering.

<2> When replacing a high wattage resistor (more than 1/2W) on a circuit board, Keep the resistor about 10mm (1/2 in.) away from circuit board.

<3> Keep wires away from high voltage or high temperature components.

<4> Keep wires in their original position so as to reduce interference.

WARNING

CHECK POWER VOLTAGE SELECTOR IS CORRECT !
120 VAC OR 240 VAC

2. SPECIFICATIONS

2-1. APPLICATION: Typical data display device for personal computer applications.

2-2. MECHANICAL DESCRIPTION

Dimensions

Height : 12.9'' (328mm) (W/O Base)

Width : 14.5'' (367mm)

Depth : 15.2'' (385mm)

WEIGHT

Net Weight : 11.5 Kg (25.3 lbs)

2-3. DISPLAY TUBE CHARACTERISTICS

Size: 14'' diagonal (13'' visual), 90°, 29.1mm neck

Dot pitch: 0.28mm/0.39mm

Gun: In-line

Surface/Transmission: Non-glare/glare, tinted

Phoshor/Persistance: X OR P22

Type No: M34KBV80 x 11/M34KDD50 x 02/M34AFA60 x 03 — 0.28mm pitch, Non-glare.

E2971B22-TC42ET (glare)/E2971B22-TC42ETHT (Non-glare) — 0.39mm pitch.

2-4. ELECTRIC PERFORMANCE

<1> Power Supply

Input Voltage: AC 110-125V/200~240V

Input Frequency: 50-60 Hz

Input Current: 1.2A max (at 120VAC)/0.6A max (at 220VAC)

Comsuption: 80W

A six feet 3-wire grounded line cord is furnished

<2> Input Signals:

Video Signal: Red/Green/Blue. All are positive analogue.

Input levels: 0-0.7 Vp-p (MAX.)

Sync Signals:

MODE	Hor-Frequency	Vert-Frequency	Hor-Sync	Vert Sync	Resolution
1	31.5 KHz	70 Hz	+	–	640 x 350
2	31.5 KHz	70 Hz	–	+	720 x 400
3	31.5 KHz	60 Hz	–	–	640 x 480
4	35.5 KHz	87 Hz	+	+	1024 x 768
5	35.2 – 38 KHz	55 – 62 Hz	+/–	+/–	800 x 600

<3> Display Color:

256 colors from a palette of over 262144

<4> Display Size:

Horizontal: 9.69'' (246mm) typical

Vertical : 7.28'' (185mm) typical

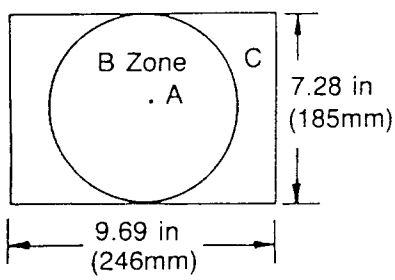
<5> PRESET TIMING

	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5
fh (kHz)	31.47	31.47	31.47	35.520	35.156
Aμs (Line time total)	31.78	31.78	31.78	28.150	28.44
Bμs (Sync. pulse)	3.81	3.81	3.81	3.919	2.00
Cμs (Back porch)	1.91	1.91	1.91	1.247	3.556
Dμs (Active)	25.42	25.42	25.42	22.810	22.22
Eμs (Front porch)	0.64	0.64	0.64	0.173	0.667
fv (Hz)	70	70	60	86.960	56.25
P ms (Frame time total)	14.27	14.27	16.68	11.50	17.78
Q ms (Sync. pulse)	0.064	0.064	0.064	0.113	0.057
R ms (Back porch)	1.907	1.112	1.049	0.563	0.626
S ms (Active)	11.12	12.71	15.25	10.81	17.01
T ms (Front porch)	1.176	0.381	0.318	0.014	0.028
	Separate Sync.	Separate Sync.	Separate Sync.	Separate Sync.	Separate Sync.
H. Sync. Polarity	Positive	Negative	Negative	Positive	Positive/Negative
V. Sync. Polarity	Negative	Positive	Negative	Positive	Positive/Negative

<6> Resolution: Horizontal: 1024 dots
Vertical : 768 lines

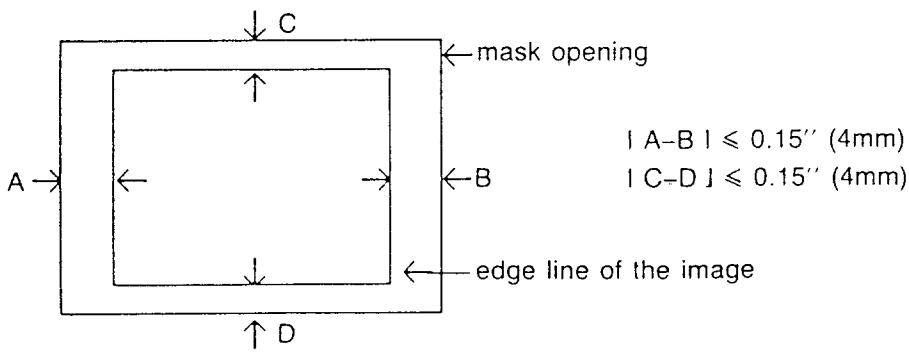
MODE	Horizontal (dots)	Vertical (lines)
1	640	350
2	640	400
3	640	480
4	1024	768
5	800	600

<7> Misconvergence:



① For 0.28mm Pitch CRT.
A point ≤ 0.005" (0.15mm) max
B Zone ≤ 0.012" (0.3mm)
C Zone ≤ 0.016" (0.4mm)
② For 0.39mm Pitch CRT
A point ≤ 0.012" (0.3mm)
B Zone ≤ 0.020" (0.5mm)
C Zone ≤ 0.024" (0.6mm)

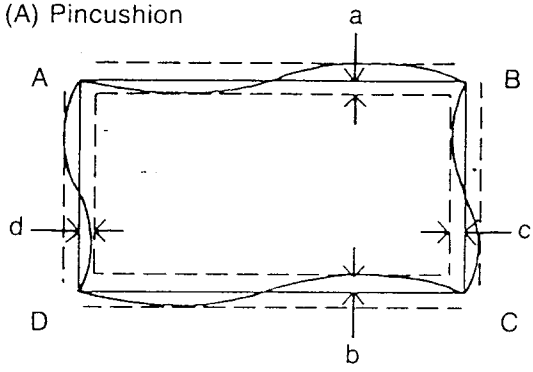
<8> Image position:



| A-B | ≤ 0.15" (4mm)
| C-D | ≤ 0.15" (4mm)

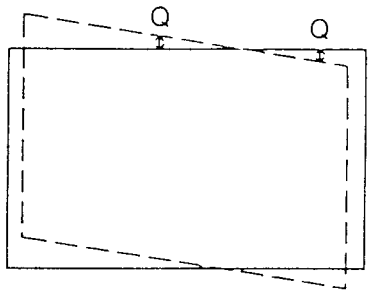
<9> Distortion

(A) Pincushion



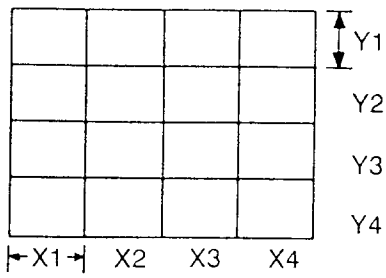
a . b ≤ 0.098'' (2.5mm)
c . d ≤ 0.098'' (2.5mm)

(B) Tilt



Q ≤ 0.5°C
≤ 0.718'' (2mm)

(C) Linearity



$$\text{Horizontal linearity} = \frac{|X-\bar{X}|}{\bar{X}} \times 100\% \leq 7\%$$

$$\text{Vertial linearity} = \frac{|Y-\bar{Y}|}{\bar{Y}} \times 100\% \leq 5\%$$

$$\bar{X} = \frac{X1+X2+X3+X4}{4} \qquad \bar{Y} = \frac{Y1+Y2+Y3+Y4}{4}$$

Note: Input Signal is a crosshatch pattern

2-5. ENVIRONMENTAL CHARACTERISTICS

Operation: 10°C to 35°C ambient
Humidity : 5% to 80% (non-condensing)
Altitnde : to 7000 feet above sea level
Storage : −40°C to 65°C

2-6. USER CONTROLS

Power-off, Brightness, Contrast, V.Center, V. Height, H.Width.

H.PHASE 1	for mode 1,2 and 3	(VGA Standard)
H.PHASE 2	for mode 5 only	(800 × 600 Mode)
H.PHASE 3	for mode 4 only	(1024 × 768 Interlace Mode)
SUB. H.PHASE 2	for mode 5 only	(800 × 600 Mode)

2-7. SIGNAL CONNECTOR

15-pin D shell connector

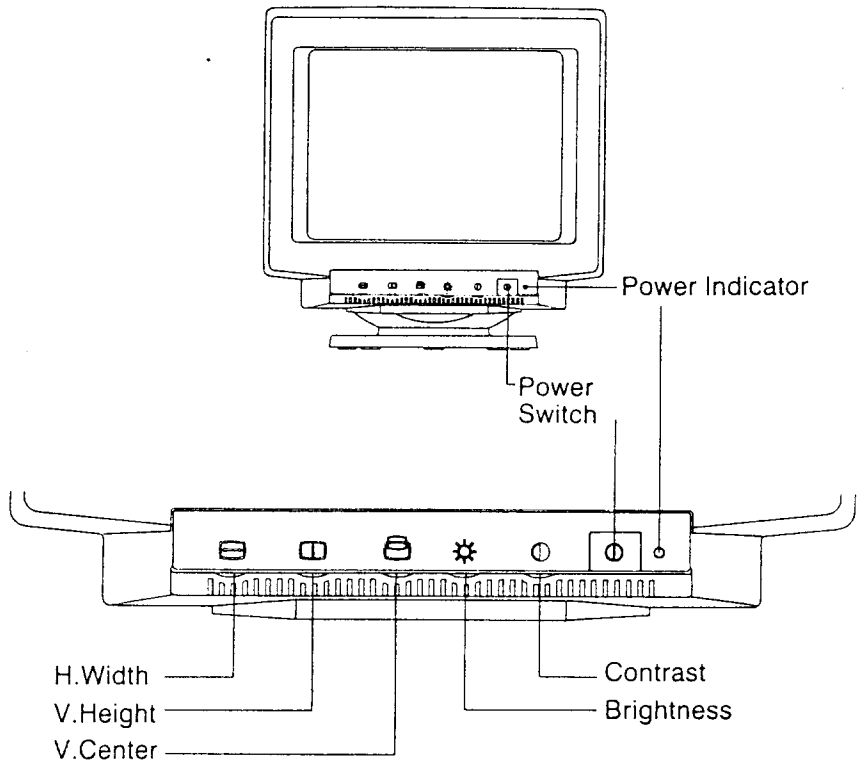
2-8. SAFETY SPECIFICATION

UL	UL1950 D3 Diviations.
FCC	CLASS B
CSA	C22.2 NO: 220
GS	EN60 950: 1988
	ZH1/618/10.80
FTZ	CLASS B

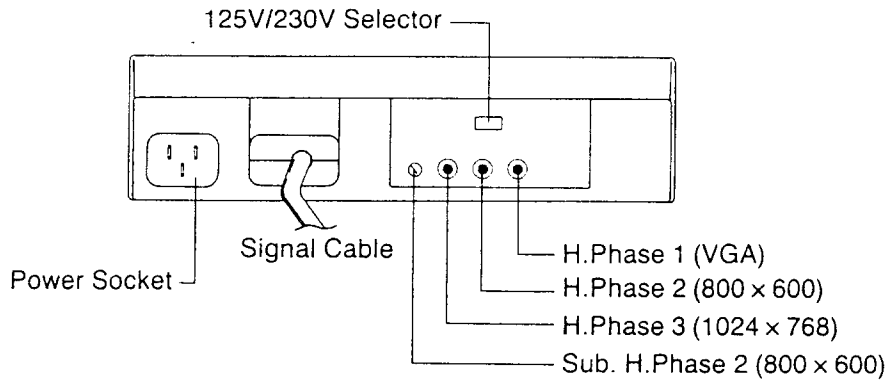
3. CONTROL LOCATIONS AND OPERATIONS

3-1. CONTROL LOCATIONS

<1> FRONT VIEW



<2> REAR VIEW



3-2. OPERATIONS

<1> POWER SWITCH : Turn the display ON/OFF by the switch. When the display is ON, the power indicator lights.

<2> CONTRAST CONTROL : Adjust the display for proper contrast level.

<3> BRIGHTNESS CONTROL: Adjust the display for proper brightness level.

<4> WIDTH CONTROL : Adjust the display for the horizontal width (Normally, it set on center detent position).

<5> HEIGHT CONTROL : Adjust the display for the vertical height (Normally, it set on center detent position).

<6> V. CENTER CONTROL : Adjust the display for proper vertical position.

<7> H. PHASE 1 CONTROL : Adjust the display only for the horizontal position of standard VGA modes.

<8> H. PHASE 2 and SUB. H. PHASE 2 CONTROL : Adjust the display for proper horizontal position of 800 x 600 mode.

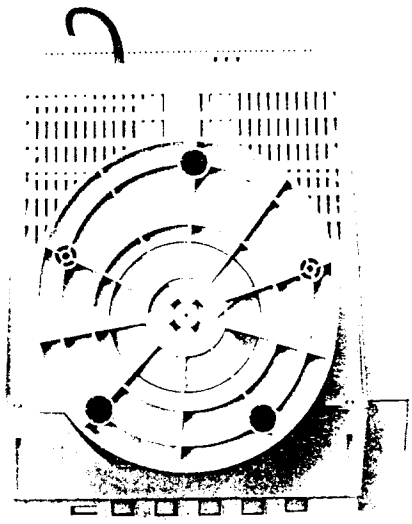
<9> H. PHASE 3 CONTROL : Adjust the display for proper horizontal position of 1024 x 768 mode.

4. DISASSEMBLY INSTRUCTIONS

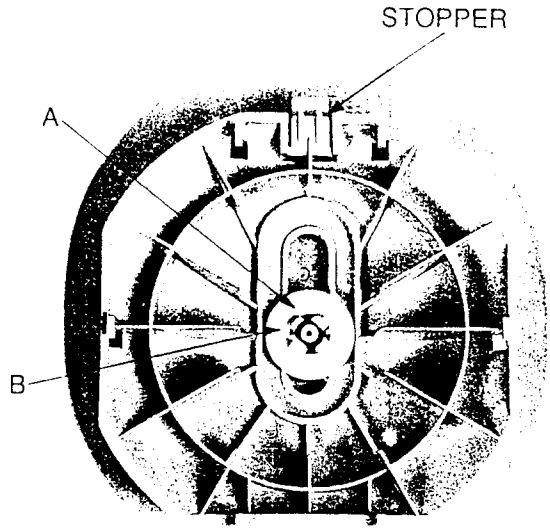
<1> SWIVEL BASE REMOVAL

First press the stopper then slide the swivel ball down and move it. (Fig. 1,2)

<2> Press 4 claw stoppers (A) to remove the fastening ring (B) and then separate the swivel ball and swivel base. (Fig. 2)



(Fig. 1)



(Fig. 2)

<3> BACK COVER REMOVAL

a) Remove 2 screws (C) from the bottom of back cover (Fig. 3) and 2 screws (D) from the back cover. (Fig. 4)

b) Remove the back cover.

<4> PCB ASSEMBLY REMOVAL

Caution: When serving or replacing the CRT. Disconnect the anode and discharge the anode completely. As high voltage (24KV) may remain on the anode for an extended time after power off.

a) Unplug the drive board from the CRT neck.

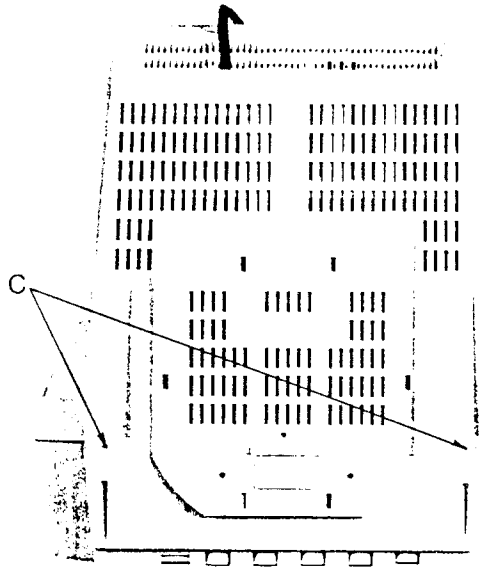
b) Unplug the DY connector, AC connector, degaussing coil connector and CRT grounding connector from the main board.

c) Discharge the remaining static electricity by shorting between anode CRT ground.

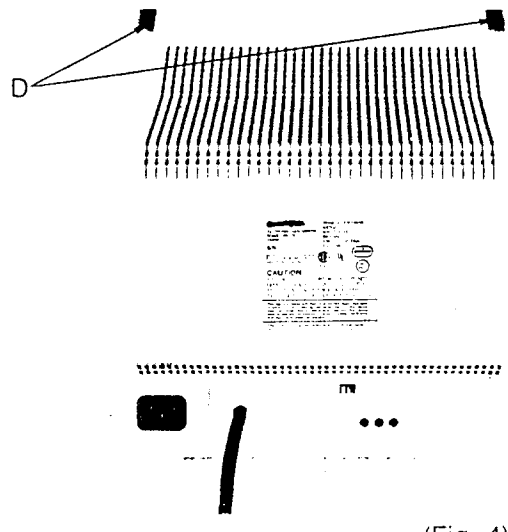
d) Remove 2 screws (E) from the FBT bracket and 1 connector (F) from heat sink (Fig. 5,6)

e) To drag 1 claw stopper (G) from the bottom of front cover to remove the bracket main. (Fig. 7)

f) Remove CRT drive board (H) from CRT neck. (Fig. 6)

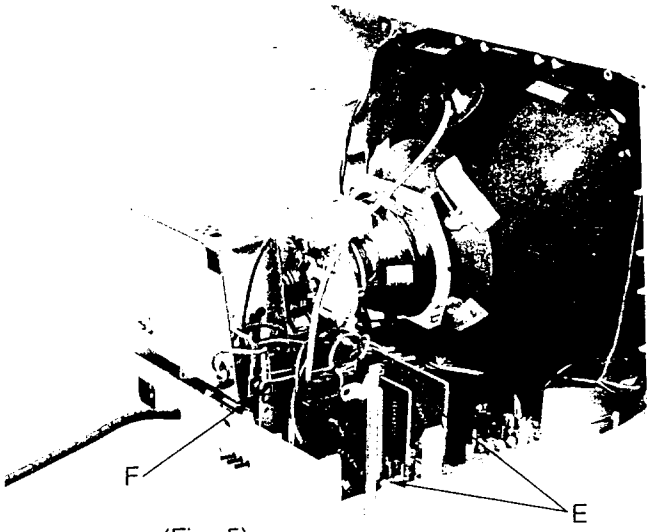


(Fig. 3)

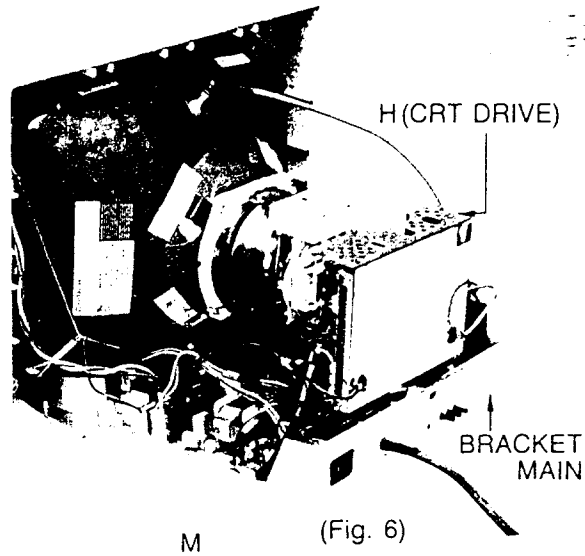


(Fig. 4)

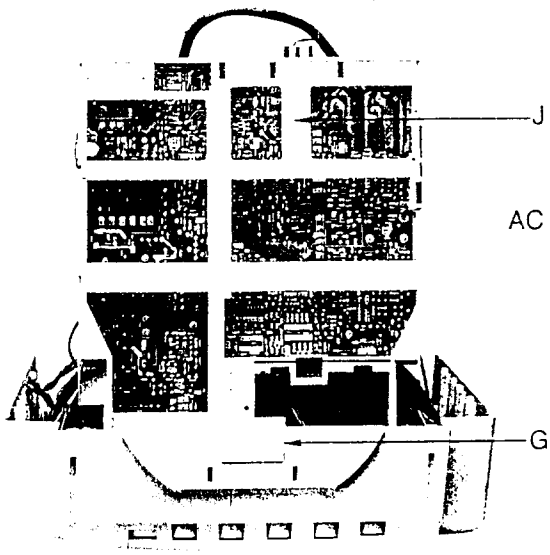
g) Remove 2 screws (I) from bracket main to remove the bracket signal cable. (Fig. 8)
h) Remove 1 screw (J) and 2 SCREWS (M) and 1 bracket switch (K) and press 2 claw stoppers (L) and from bracket main to remove the PCB main board. (Fig. 7,8)



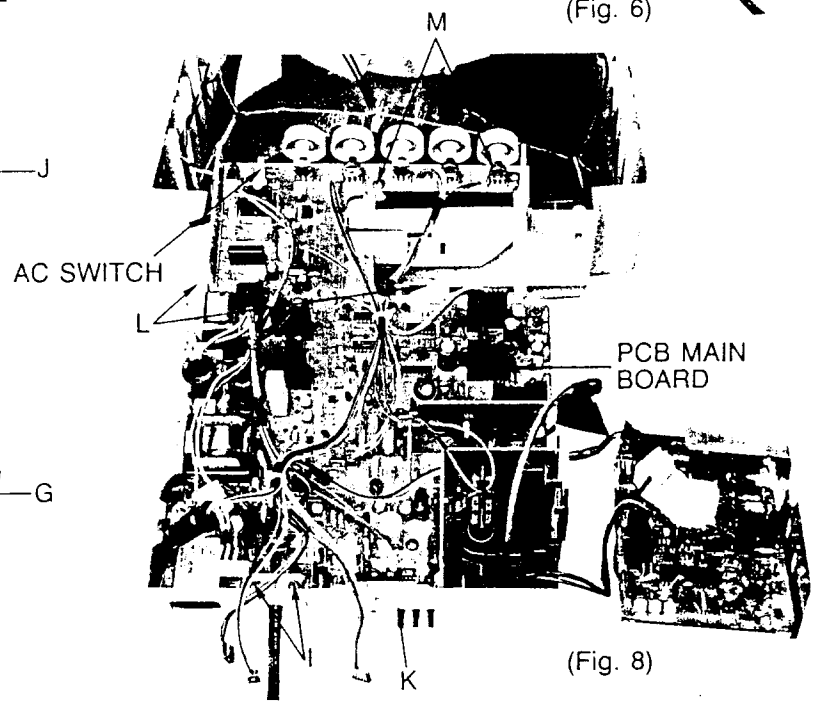
(Fig. 5)



(Fig. 6)

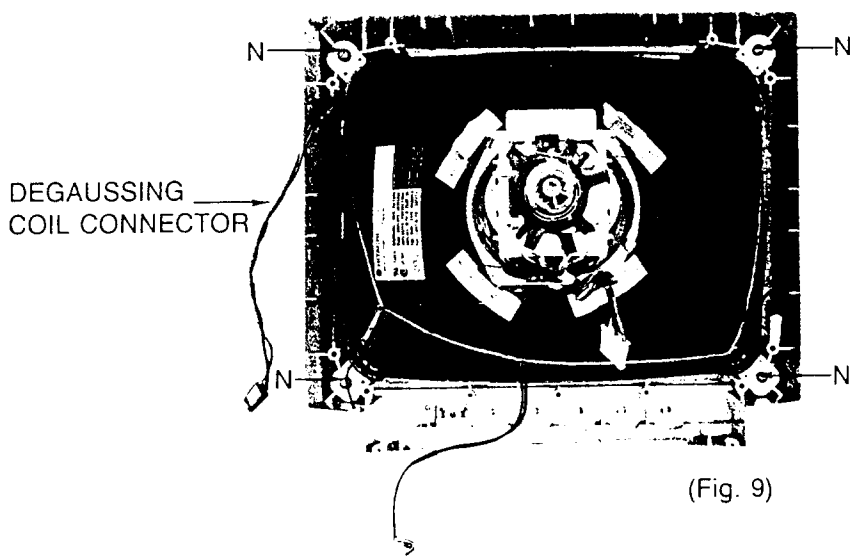


(Fig. 7)



(Fig. 8)

<5> CRT REMOVAL (Fig. 9)
a) CRT is supplied as ITC.
b) Remove 4 screws (N) from the front cover to move the CRT.
CAUTION: Do not lift the CRT by the neck.



(Fig. 9)

5. GENERAL CONNECTION & APPLICATIONS

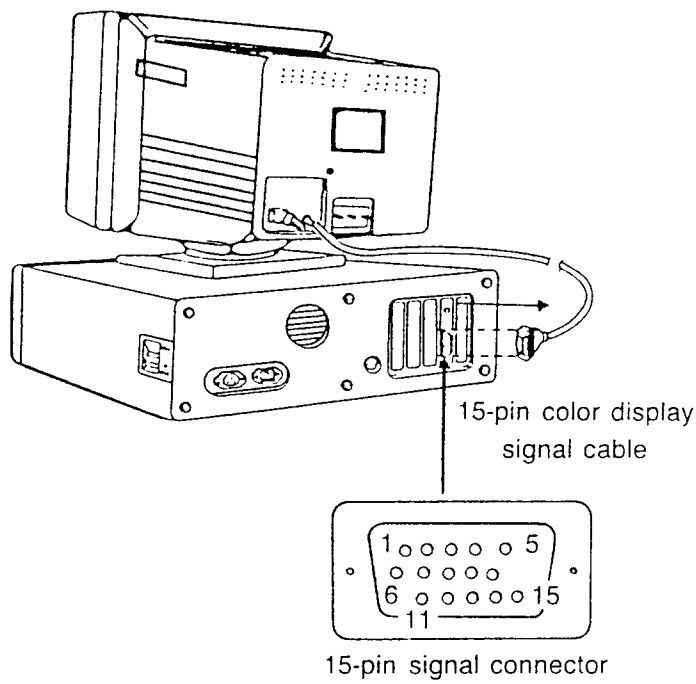
Procedure for installing and using this Model of Color Display

<1> Place the display on the desired operating location, plug the power cord into the monitor and then an AC outlet. Be certain that the AC outlet is 100-125 VAC/200~240 VAC.

<2> The three-wire power cord is provided as a safety precaution as it connects the chassis and cabient to the electric conduct ground. If the AC outlet in your location does not have provision for the grounded type plug, the installer should attach the proper adapter to ensure a safe ground protential.

<3> Connect the 15-pin color display shielded signal cable to the video adapter output on your computer and lock both screws on the connecter to ensure them grounding. The connector appears as follows:

Pin No	Description
1	Red Signal
2	Green Signal
3	Blue Signal
4	Jumper to Pin 10
5	Self Test
6	Red Return
7	Green Return
8	Blue Return
9	No Pin
10	Digital Ground
11	Jumper to Pin 10
12	No Pin
13	Horizontal Sync.
14	Vertical Sync.
15	No Pin



<4> Turn on the computer power switch.

<5> Apply power to the display by turning the color display switch to the "ON" position and allow about thirty seconds for display tube warm up. The normal indicator lights when the display is on. After a two seconds, data should appear on the screen. Adjust the brightness and contrast for the best readability.

<6> Adjust the horizontal phase as necessary for proper horizontal display.

A) The H.Phase 1 control includes all of standard VGA modes (M1, M2 and M3).

B) The H.Phase 2 and SUB. H.Phase control super VGA 800 x 600 mode only.

C) The H.Phase 3 control 8514/A 1024 x 768 interlace mode only.

<7> V size can adjust to give you a proportional display height.

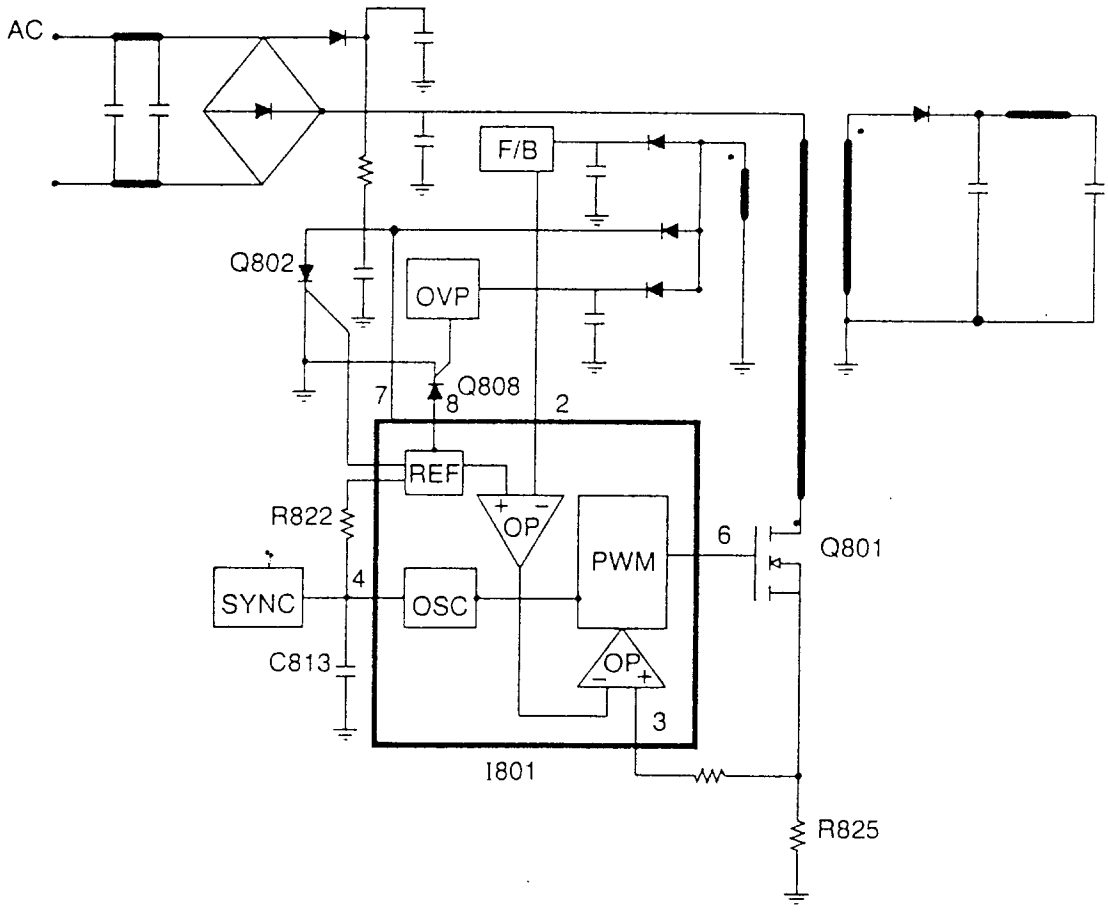
<8> H-width control the hrizontal width. If the H-width did not meet your requirement, turn this control continuously until a suitable width is resulted.

If Your Color Display require service, refer to the controls and adjustment information of publication and verify that all controls and adjustment on the display are property set. If your display does require service it must be returned with the power cord.

6. ELECTRONIC CIRCUIT DESCRIPTION

6-1. SWITCHING MODE POWER SUPPLY (SMPS)

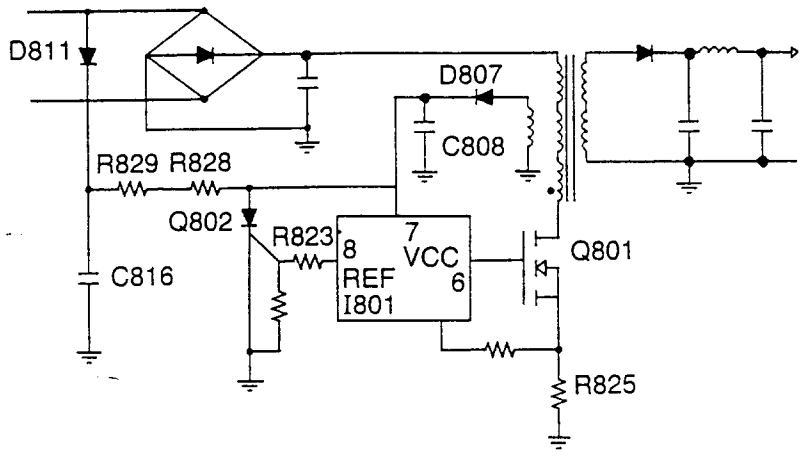
<1> Circuit Diagram



<2> Circuit Description

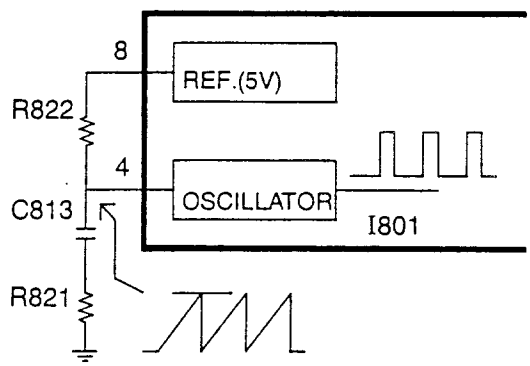
1. Start Circuit

Prior to starting a low current drained from AC line via D811 R828 R829 to pin 7 of I801, it charge the C808. The I801 operates immediately, when C808 voltage over 16V. Then Q802 is trigged by the reference voltage (5v) from pin 8 of I801 at the same time, Q801 turn ON, there is a primary current flow through the primary winding and energy storaged in the primary winding. During Q801 turns off, the storaged energy transfer to secondary winding, the auxiliary winding is well-coupled and in phase with the secondary winding, it will provide voltage on C808 and supply to pin 7 of I801, to keep I801 working, C808 voltage must be over 10V.



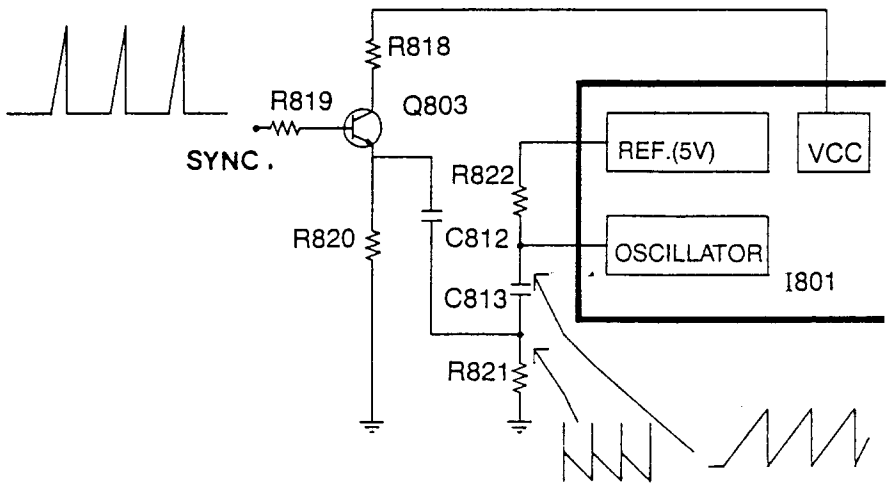
2. Sawtooth Oscillator Circuit

The oscillating frequency is around 30KHz, it is determined by the timing components R822 and C813, C813 being charged to 2.8V from the REF. Voltage (5V) through R822, and it discharged to 1.2V. During the discharge time interval. The oscillator generates a series of blanking pulses that causes the low output state (pin 6 of I801).



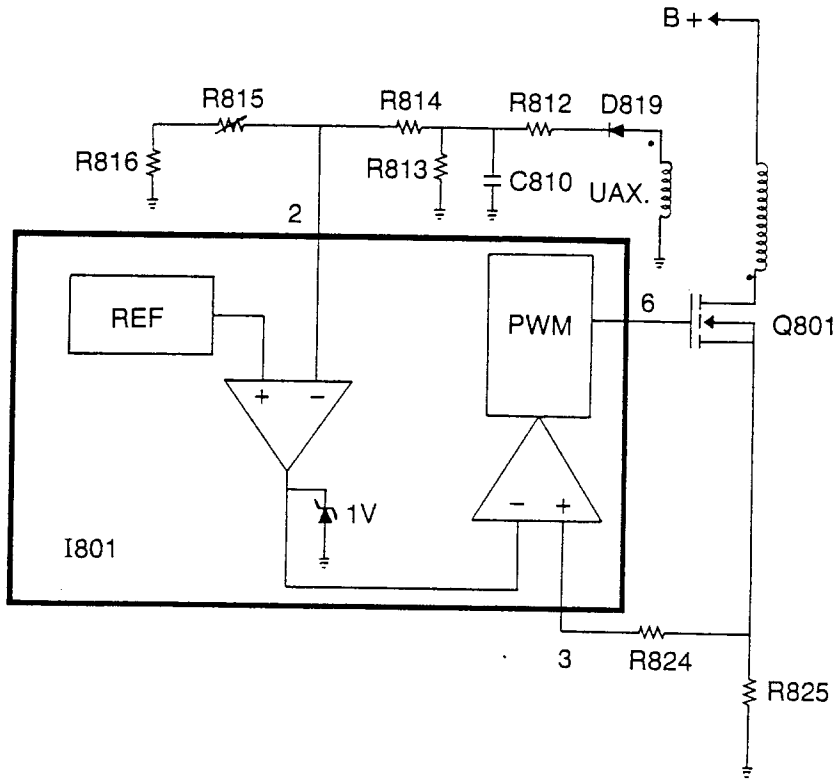
3. Synchronization

The oscillating frequency can be synchronized by pulses coupled from flyback transformer of horizontal circuit. The pulse provides a basic current to drive ON Q803, and collector current of Q803 flow to R818, Q803, and R820. The needle-pulse feed to pin 4 of I801, via C812, R821, and C813, so the voltage of C813 being forced to discharge early. This operation makes oscillating frequency in phase with the horizontal frequency.



4. Pulse Width Control

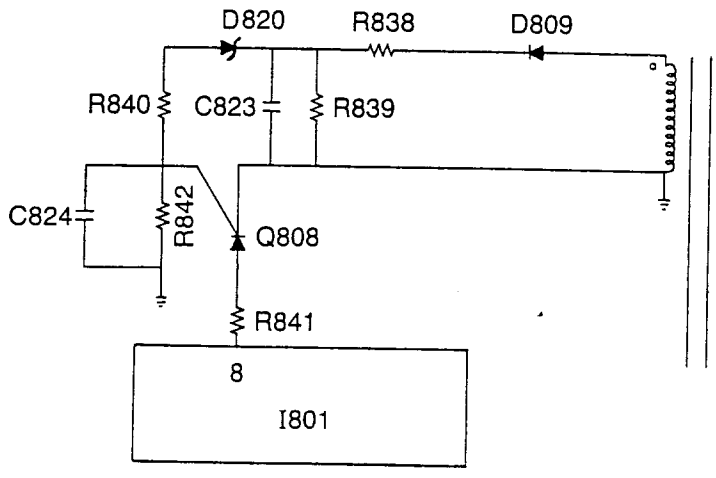
The primary auxiliary winding is well-coupled and in phase with the secondary winding. It supplies the power to pin 7 of I801 and refects the load and line regulation to pin 2 of I801, via D819, R812 and R814, the voltage ON pin 2 of I801 compares with the internal reference voltage (2.5V), and generates an error voltage to another internal one, the error voltage will compare with the voltage drop of R825 while Q801 turns ON. When the voltage of R825 reached to the error voltage the Q801 turns OFF. Therefore the error voltage can control the duty cycle of PWM to obtain the regulated voltage for outputs.



5. Protection Circuit

The power supply has a full protective circuit against output overload, short circuit and over voltage. Once the over load or short circuit occurred at the secondary, the voltage of R825 reache to 1 Vp-p rapidly. It blocks the power output, so the pin 7 of I801 voltage decreased below 10V, I801 turns OFF. The power circuit shut down and latched by Q802.

On abnormal conditions, if the over voltage presents at auxiliary winding, the zener diode (D820) will be conducted through D809 and R838, the current flows to R840, R842 and then the Q808 is trigged. The voltage ON pin 8 of I801 clamped to low state, I801 turn OFF, the power circuit shut down and latched by Q802.



6-2. AUTOMATIC DEGAUSSING CIRCUIT

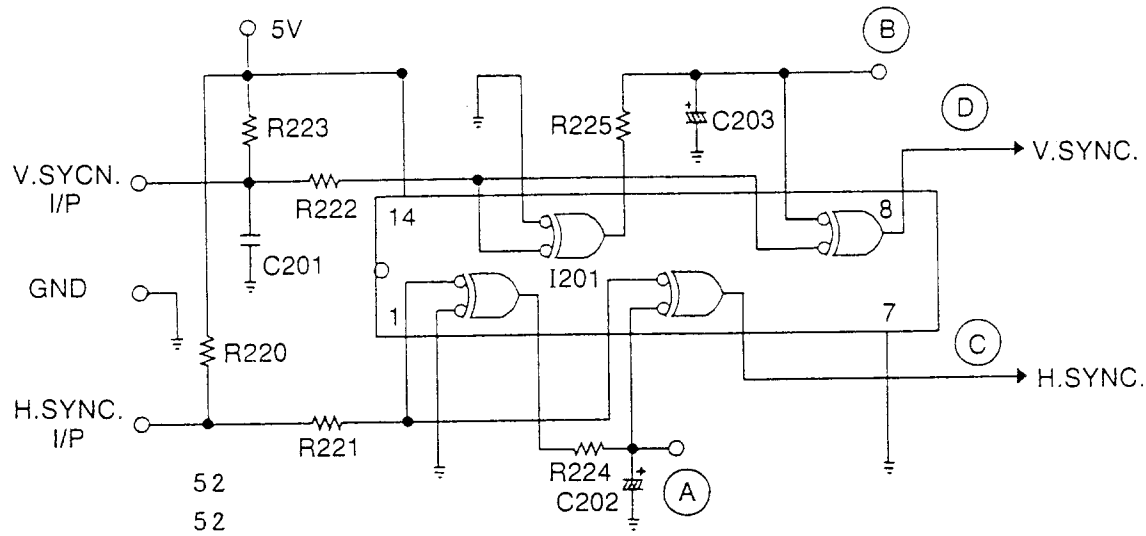
Posistor R803 and degaussing coil compose an automatic degaussing circuit to demagnetic the shadow mask and internal shield in the CRT.

Posistor shows low resistance value (20Ω) in mormal temperature, when apply AC line voltage, big current flows into degaussing coil, only few seconds, resistance of posistor increase rapidly due to rising in heat, degaussing current thus decrease to less than 100 mAp-p rapidly, degaussing functions is completed.

6-3. MODE CONTROL CIRCUIT

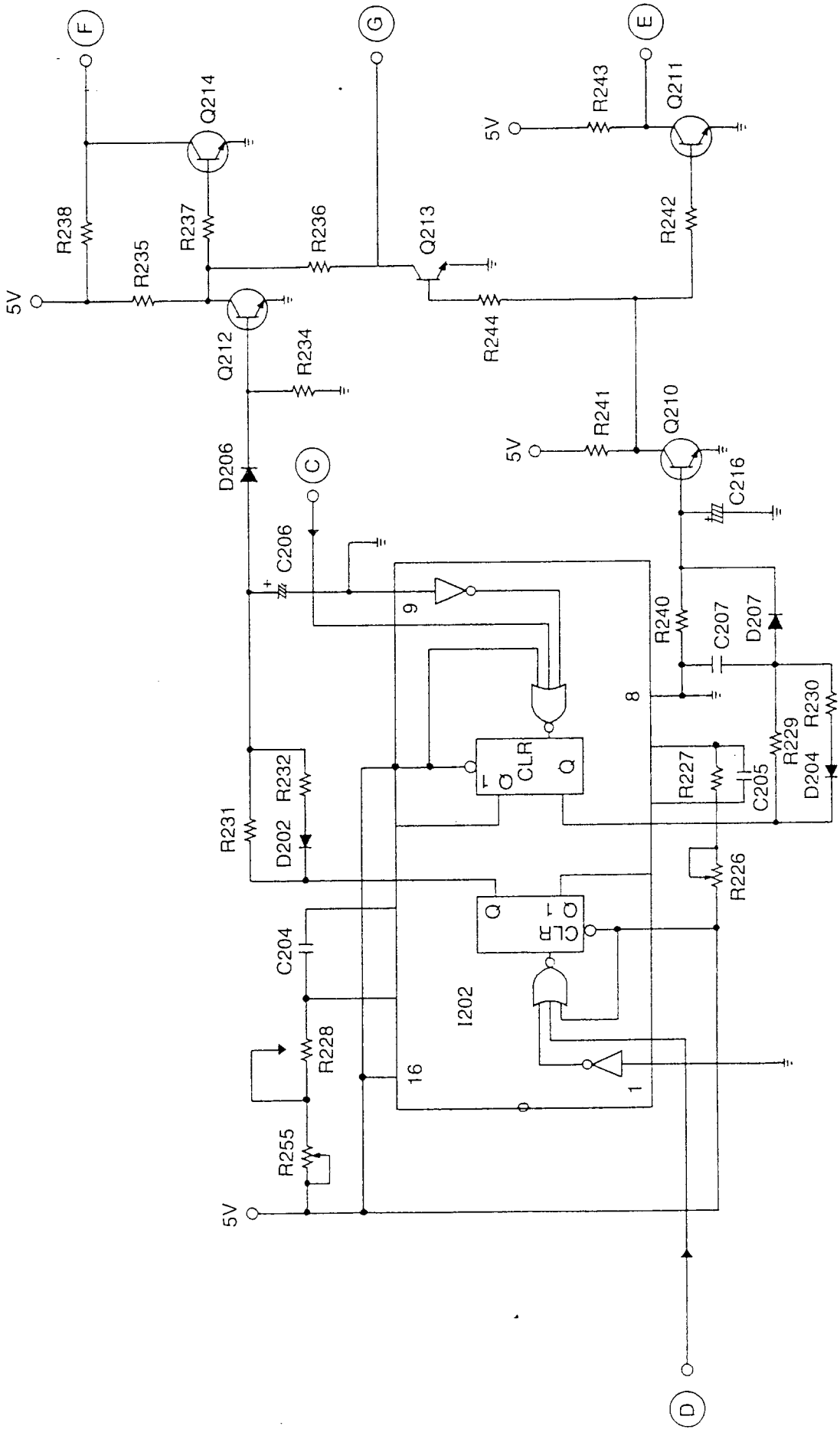
<1> Sync. Control

In spite of the polarities of both horizontal and vertical Sync. pulse, I201 generates the positive Sync. pulse.



	INPUT				OUTPUT			
	fh	fv	H.Sync.	V.Sync.	A	B	C	D
VGA (Mode1)	31.4KHz	70Hz	⊓	⊔	LOW	HIGH	⊓	⊓
VGA (Mode2)	31.47KHz	70Hz	⊔	⊓	HIGH	LOW	⊓	⊓
VGA (Mode3)	31.47KHz	60Hz	⊔	⊔	HIGH	HIGH	⊓	⊓
8514/A (Mode4)	35.52KHz	87Hz	⊓	⊓	LOW	LOW	⊓	⊓
SVGA (Mode5)	35.1-38KHz	55-61Hz	—	—	—	—	⊓	⊓

<2> Frequency Control



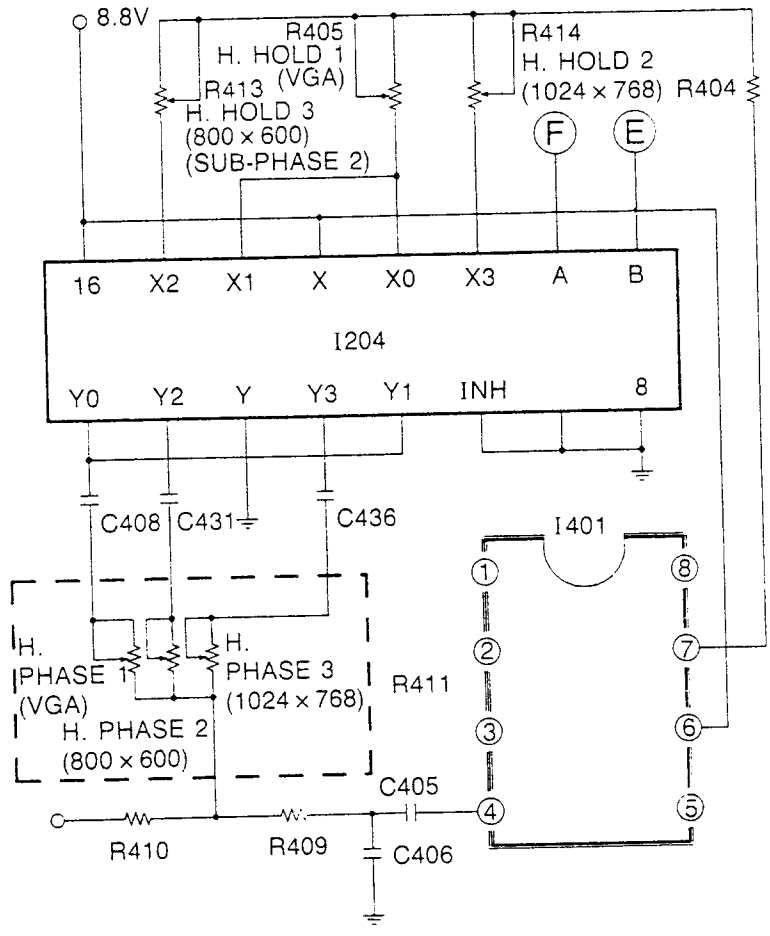
	INPUT				OUTPUT		
	fh	fv	C	D	E	F	G
VGA (Mode1)	31.47KHz	70Hz			OV	OV	OV
VGA (Mode2)	31.47KHz	70Hz			OV	OV	OV
VGA (Mode3)	31.47KHz	60Hz			OV	OV	OV
8514/A (Mode4)	35.52KHz	87Hz			5 V	5 V	OV
SVGA (Mode5)	35.1-38KHz	55-61Hz			5 V	OV	5 V

By detecting the Sync. frequency, I202 generates the signal to control the modes of 31K/35K, mode 4 and mode 5.

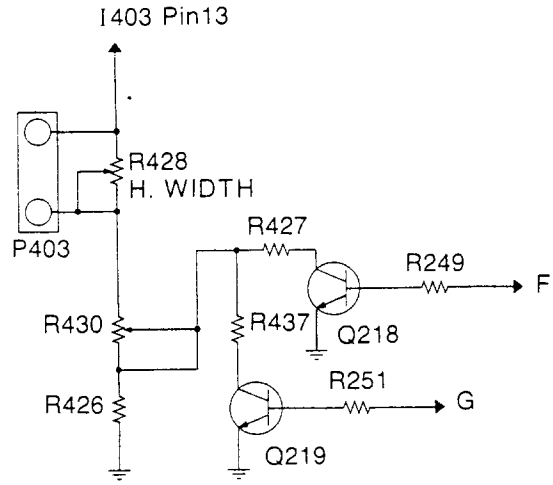
<3> Horizontal OSC, phase and width control

By use the signal of point E, F and G to control the horizontal OSC, phase and width.

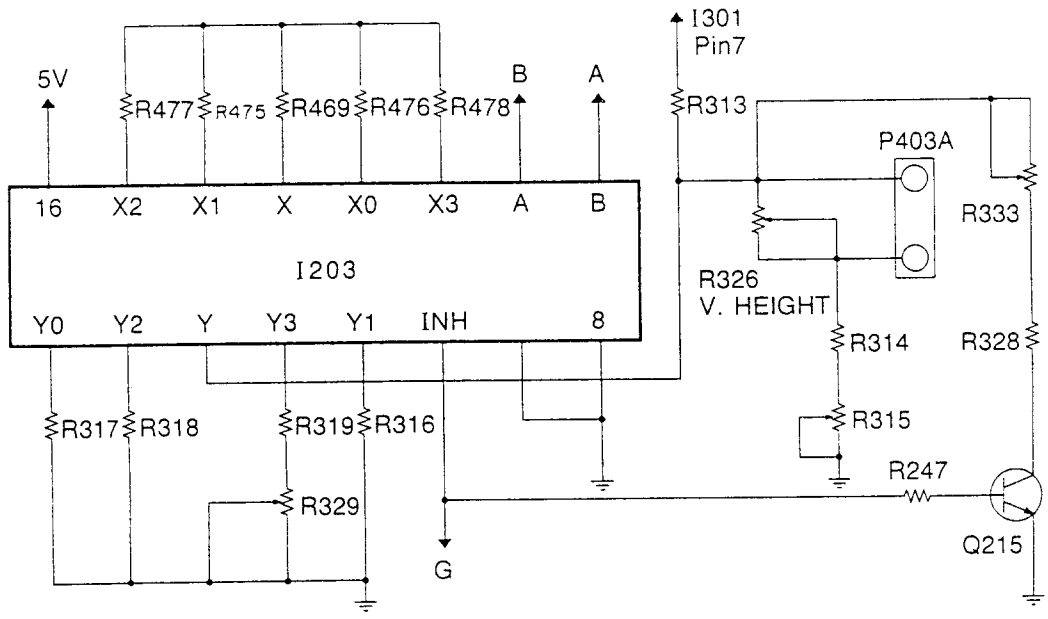
1. OSC and PHASE control



2. WIDTH control



<4> Vertical height and side pincushion correction control by use the signal of points A, B and G to control the vertical height and side pincushion of all modes.



	INPUT			OUTPUT			
	A	B	INHIBIT	X0/Y0	X1/Y1	X2/Y2	X3/Y3
VGA (Mode1)	LOW	HIGH	LOW	OFF	OFF	ON	OFF
VGA (Mode2)	HIGH	LOW	LOW	OFF	ON	OFF	OFF
VGA (Mode3)	HIGH	HIGH	LOW	OFF	OFF	OFF	ON
8514/A (Mode4)	LOW	LOW	LOW	ON	OFF	OFF	OFF
SVGA (Mode5)	—	—	HIGH	OFF	OFF	OFF	OFF

6-4. VERTICAL DEFLECTION CIRCUIT

The vertical sync. is applied pin 5 of I301, R302, R304, C310 connected to pin 3, pin 4 and pin 6 determin the freerunning frequency of the oscillator inside I301.

The resistance between pin 7 of I301 and ground defines the current mirror and then the height of the scanning.

Pin 9 of I301 is output of the current mirror that change the series of C305 and C306. This pin is also the input of buffer stage. Pin 10 of I301 is the output of the buffer stage.

Pin 12 of I301 is the inverting input of the amplifier.

R307 and R310 define the DC level across C309, so allowing a correct centering of the output voltage.

R308 and C308 in conjunction with R307 and R310, applied at the feedback input pin 12 of I301, a small part of the parabola, available across C309, and the AC feedback voltage, taken across R312. R305 and R310 produce the linearity correction on the output scanning currently.

The output of power amplifier from the pin 1 of I301 drives the vertical deflection yoke by a negative slope current ramp, R309 and C307 are used to stabilize the power amplifier.

The supply voltage of the power output stage is forced at pin 2. During the trace time the supply voltage is obtained from the main supply voltage by D301, while during the retrace time this pin is supplied from the internal flyback generator.

Pin 15 is the output of the flyback generator that, when driven, jumps from low to high condition. An external eapacitor C302 transfers the jump to pin 2.

Pin 13 is the output of the vertical blanking pulse. This blanking pulse width control by R303.

Pin 14 is the main supply voltage input.

6-5. HORIZONTAL DEFLECTION CIRCUIT

The positive horizontal sync. pulse from pin 6 of I201 is converted and amplified by Q407. Then be applied through the differential circuit C407/R408 to pin 3 of the horizontal IC I401.

The positive horizontal flyback pulse derived from C414 (collector pulse of Q403) is integrated by the comparable sawtooth-waveform generator which is composed of R410, R411, C408, C409, and C406, then be applied via C405 to pin 4 of I401.

The discriminator inside the IC I401 detects the phase difference between the sync. input from pin 3 and the sawtooth-waverform from pin 4, the superimposed pulse output from pin 5 of I401 is integrated by the low-pass-filter R407, C404 and C403, AFC voltage is obtained and applied via R406 to pin 7 of I401, thereby controlling the oscillator.

The oscillator inside IC I401 is an RC type with pin 7 used to control the timing. R404, R405, R417 and C402 altogether determine the horizontal oscillatting frequency.

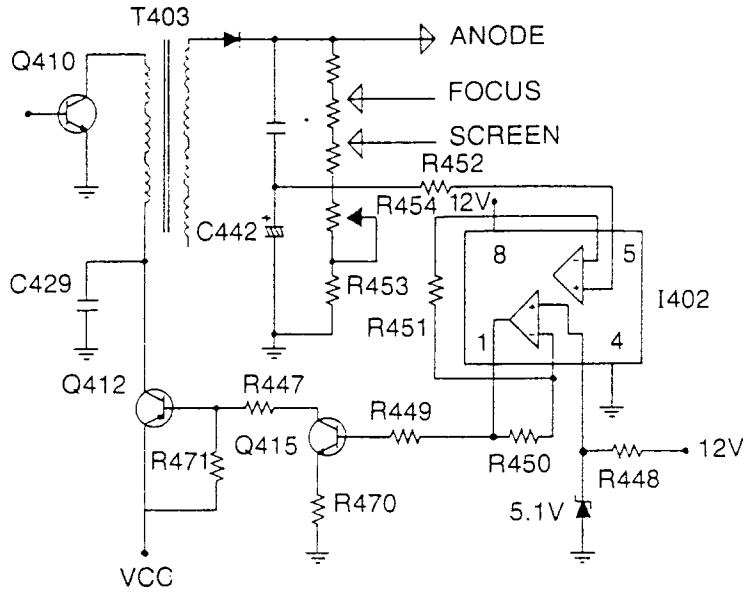
The predriver output of I401 is at pin 1 of which duty cycle is controlled by R402 and R403 at pin 8 of I401.

Regulated voltage applied at pin 6 of I401 is about 8-9 volts.

The output signal from pin 1 of I401 is then amplified by Q402 and coupled by T401 to the horizontal output stage Q403 for ON-OFF control, thus sawtooth-waveform current through the horizontal deflection coil is obtained.

Also from pin 1 of I401 is amplified by Q409 and coupled by T402 to the output stage Q410 for ON-OFF control. During the retrace time, a flyback pulse of about 700 volts is produced at the collector of Q410, this pulse is transfered and rectified by the FBT (T403) to obtain a high voltage of about 23.5KV for anode of CRT.

6-6. HIGH VOLTAGE REGULATION CIRCUIT



By detecting the voltage that seperated from focus resistor, and applied to I402. To compare with the reference voltage 5.1V, it was amplified by OP Amplifier, then via Q415 and Q412 to control the voltage that applied to the primary coil of FBT for keep the constant H.V.

6-7. SIDE PINCUSHION CORRECTION CIRCUIT

The vertical sawtooth waveform from R312 is integrated by C315, R442, R432 and C421 to produce a parabolic waveform. This parabolic voltage is amplified by I403 (OP Amplifier), then via Q404 and Q405 to correct side pincushion.

6-8. VIDEO CIRCUIT

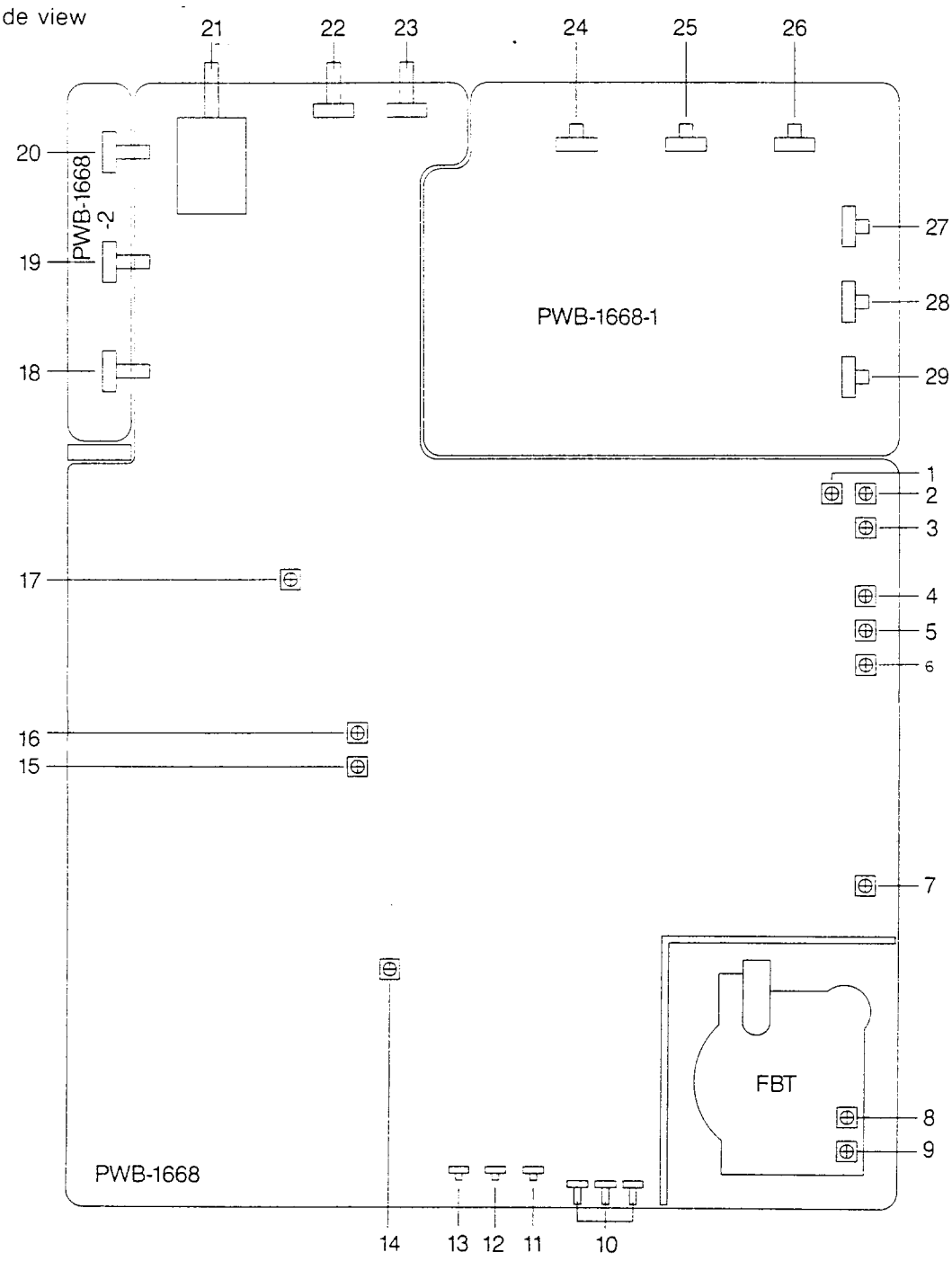
Video amplifier consists of preamplifier (LM1203) output stage, buffer stage and cutoff adjustment circuit.

To adjust the R910, R940 and R970 to control the DC level of cathode. R502, R532 and R562 are used to control the gain of signal.

7. ADJUSTMENT

Service Adjustment Control Locations

Parts side view



1. V. HEIGHT 5	(R333)	11. H. HOLD 3	(R413)	21. ON/OFF SWITCH	(S801)
2. V. HEIGHT 3	(R329)	12. H. HOLD 1	(R405)	22. CONTRAST	(R590)
3. V. HEIGHT 1	(R315)	13. H. HOLD 2	(R414)	23. BRIGHTNESS	(R950)
4. V. LIN.	(R311)	14. H. WIDTH ADJ.	(R430)	24. B-CUTOFF	(R970)
5. V. HOLD	(R304)	15. 31 KHz/35 KHz	(R228)	25. R-CUTOFF	(R910)
6. DPC. ADJ.	(R434)	16. 60 Hz/86 Hz	(R255)	26. G-CUTOFF	(R940)
7. HV. ADJ.	(R454)	17. B + ADJ.	(R815)	27. R-DRIVE	(R502)
8. FOCUS		18. H. WIDTH	(R428)	28. G-DRIVE	(R532)
9. SCREEN (G2)		19. V. HEIGHT	(R326)	29. B-DRIVE	(R562)
10. H. PHASE 1,2,3,	(R411)	20. V. CENTER	(R324)		

7-1. B+ VOLTAGE OUTPUT ADJUSTMENT

a) Apply a VGA signal with full white pattern to the unit.
b) Apply 120V AC to the unit.
c) Turn the brightness VR R950 to its center position. Turn the contrast VR R590 control fully clockwise at Max. position.
d) Connect a digital voltage between D812 cathode and ground.
e) Turn the unit on.
f) Adjust R815 (B + ADJ) to 88V ± 1V.
g) Confirm the voltage across C822 is 105V ± 2V.
h) Confirm the voltage across C819 is 19.3V ± 1V.
i) Confirm the voltage across C818 is 6.2V ± 0.3V.

7-2. H, HOLD 1, 2 AND 3 ADJUSTMENT

a) Apply a VGA, 8514/A (1024 x 768) and Super VGA (800 x 600) signal to the unit.
b) Connect a jump lead from Q407 collector to ground.
c) Adjust R405 (H. Hold 1 for VGA mode), R414 (H. Hold 2 for 8514/A mode 1024 x 768) and R413 (H. Hold 3 for super VGA 800 x 600 mode) to obtain a stable picture.
d) Remove the jump lead from Q407 collector.

7-3. H. PHASE ADJUSTMENT

a) Apply a VGA, 8514/A (1024 x 768) and Super VGA (800 x 600) signal to the unit.
b) Adjust R411 (H. PHASE 1 for VGA, H. Phase 2 for Super-VGA and H. Phase 3 for 8514/A) to move the data area to the center of the screen.
c) Adjust R413 (Sub. H. Phase 2) to move the data area if necessary.

7-4. HIGH VOLTAGE ADJUSTMENT

a) Apply a VGA signal with full white pattern to the unit.
b) Turn the brightness VR R950 control fully counter-clockwise at Min. position.
c) To measure the high voltage. Use a high impedance high voltage meter.
d) Adjust R454 (H.V. ADJ) to set the high voltage to 23.5 KV ± 0.5 KV.

7-5. H.31KHZ/35KHZ CONTROL ADJUSTMENT

a) Apply a VGA signal to the unit.
b) Use a oscilloscope to test the pulse that between D202 cathode and ground.
c) Adjust R228 (H. 31KHZ/35KHZ ADJ) to set the width of the pulse T is 2.2μs ± 0.2μs. (Figure 7-2)

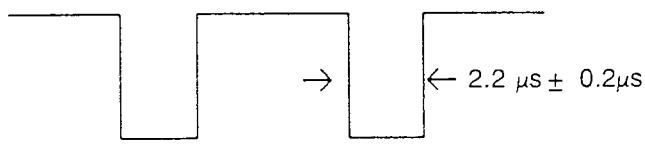


Figure 7-2

7-6. V. 56HZ/86HZ CONTROL ADJUSTMENT

a) Apply a VGA 70Hz signal (M1 or M2) to the unit.
b) To use a oscilloscope to test the pulse that between D204 cathode and ground.
c) Adjust R255 to set the width of the pulse T is 1.2~1.5ms (Figure 7-2).

7-7. H. WIDTH ADJUSTMENT

a) Set the VR R428 (H.WIDTH) that on front cover to the center detent point.
b) Apply a VGA signal to the unit.
c) Adjust R430 (H. Width) to set the horizontal width of the data area is 246mm.

7-8. V. LINEARITY ADJUSTMENT

a) Apply a VGA signal with cross hatch pattern to the unit.
b) Adjust R311 (V.LIN) to equal the length of A and B.

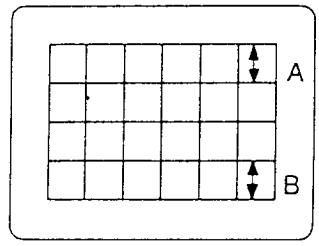


Figure 7-3

7-9. V.HEIGHT ADJUSTMENT

a) Set the VR R326 (V.Height) that on front cover to the center detent point.
b) Apply a VGA and Super VGA (800 x 600) signal.
c) Adjust R315 (V.Height 1) to the height of VGA mode 1 be 185mm, then adjust R329 to the height of VGA mode 3 be 185mm and then adjust R333 to the height of Super-VGA be 185mm.

7-10. PINCUSHION ADJUSTMENT

a) Apply a VGA signal with cross hatch pattern to the unit.
b) Adjust R434 (PINCUSHION) to correct the side pincushion correction.
c) Ensure that no barrel distortion occurs because of the adjustment.

7-11. V.CENTER ADJUSMTNET

a) Apply a VGA signal with cross hatch pattern to the unit.
b) Adjust R324 (V.CENTER) to set the data area to the vertical center.

7-12. V.HOLD ADJUSTMENT

a) Apply a 8514/A signal to the unit.
b) Adjust R304 (V.HOLD) until the display stablizes.

7-13. FOCUS ADJUSTMENT

a) Apply a VGA signal with cross hatch pattern to the unit.
b) Adjust the focus VR located at the high voltage resistor block until the display has the best overall focus.

7-14. White Balance Adjustment

a) Apply no signal to the unit.
b) Turn the Brightness VR R950 control fully clockwise at max. position.
c) Turn VR R910 (R.CUT OFF), R940 (G.CUT OFF), R970 (B.CUT OFF) to 45° position
d) Adjust G2 VR to 0.8~1.2 FL.
e) Use the color Analyzer. Adjust the R910 (R.CUT OFF) and 970 (B.CUT OFF) until the following display data has obtained: X = 0.281 Y = 0.311.
f) Use signal 50mm x 50mm green only pattern to the unit.
g) Turn the brightness VR R950 to the center detent position. Turn the contrast VR R590 control fully clockwise at max. position.
h) Use the color Analyzer. Adjust the R532 (G.DRIVE) to 30 FL.
i) Use signal 50mm x 50mm white pattern to the unit.
j) Turn the contrast VR R590 to 15FL.
k) Use the color Analyzer. Adjust the R502 (R.DRIVE) and R562 (B.DRIVE) until the following display data has been obtained: X = 0.281 Y = 0.311.

7-15. CONVERGENCE ADJUSTMENT

Note: Before adjustment convergence the vertical size, linearity and focus adjustment must be completed.

a) Apply a VGA signal with crosshatch pattern to the unit.

b) The brightness level should be no higher than necessary to obtain a clear pattern.

c) Loosen the convergence magnet lock ring converge the red and blue lines at the center of the screen. By rotating the R-B Static Convergence Magent.

d) Align the converged red/blue lines with the green lines at the center of the screen by rotating the (RB)-G Static Convergence Magent. (See figure 7-4)

e) Tighten the convergence magent lock ring.

f) Remove the DY wedges (See figure 7-5) and slightly tilt (do not rotate) the deflection yoke horizontally and vertically to obtain good overall convergence.

g) Secure the delfection yoke by reinserting the wedges. (See figure 7-5)

h) If purity error is found, repeat the purity adjustments.

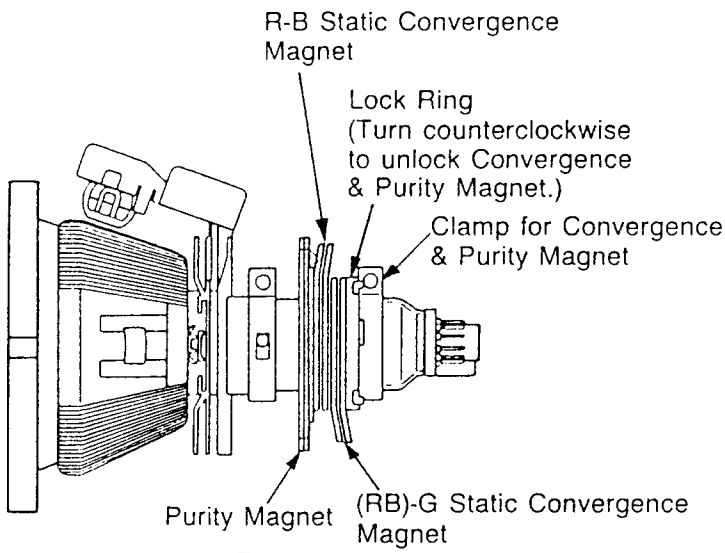

R-B Static Convergence Magnet
Lock Ring (Turn counterclockwise to unlock Convergence & Purity Magnet.)
Clamp for Convergence & Purity Magnet
Purity Magnet
(RB)-G Static Convergence Magnet

Figure 7-4

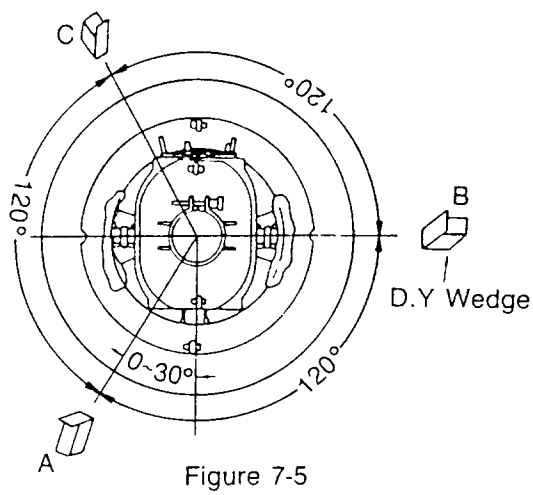
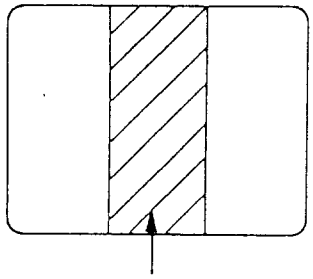


Figure 7-5

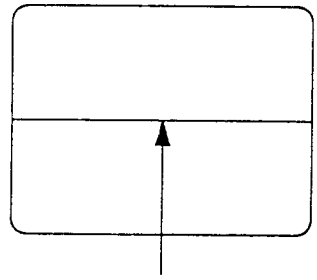
7-16. COLOR PURITY ADJUSTMENT

a) Operate the display for 20 minutes. With the Bright control at max. position to warm up the CRT.
b) Degauss the display fully by using an external degaussing coil.
c) Roughly adjust convergence.
d) Apply a VGA signal with white pattern to the unit.
e) Turn red and blue Cut Off controls fully counterclockwise to obtain a green field.
Adjust Drive-controls if green field is not obtained.
f) Loosen the deflection yoke clamp screw and move the deflection yoke as close to the purity magnet as possible.
g) Loosen the purity magnet lock ring (See figure 7-4) and adjust the purity magent to set the vertical green raster precisely at the center of the screen. (See figure 7-6) Then tighten the lock ring.
h) Slowly move the deflection yoke forward and adjust for the best overall green screen.
i) Tighten the deflection yoke clamp screw.
j) Produce the blue and red raster by Cut Off controls and observe that good purity is obtained on the repective field.
k) Observe that a uniform white raster is obtained by adjusting R.B Cut Off controls. If screen is not uniformly white. Repeat above procedure.
Note: Purity correction magent may be effective to control purity slightly.

* "15. Convergence Adjustment" and "16. Color Purity Adjustment" are not necessary when the CRT is replaced as ITC.



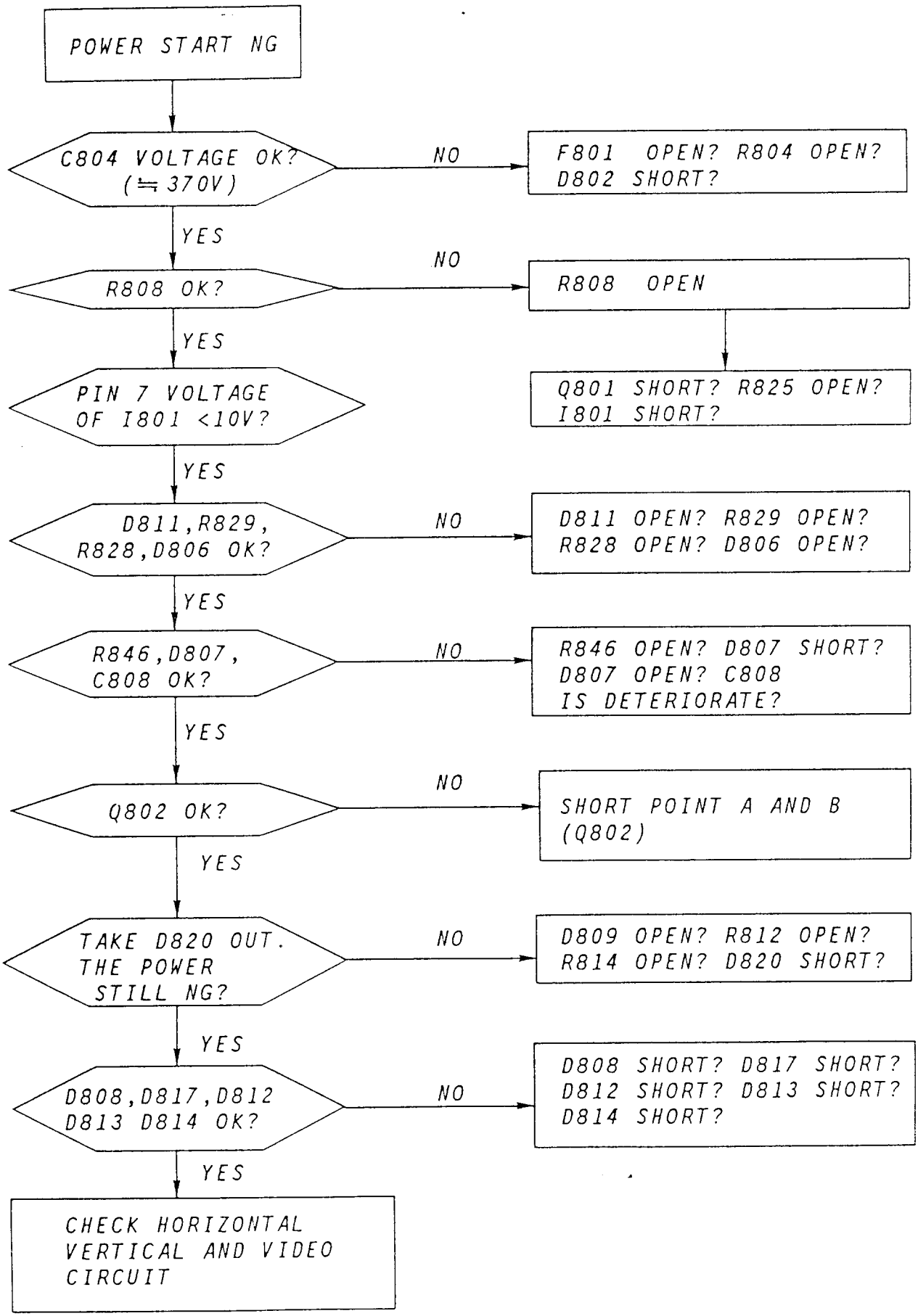
Green Raster
Figure 7-6



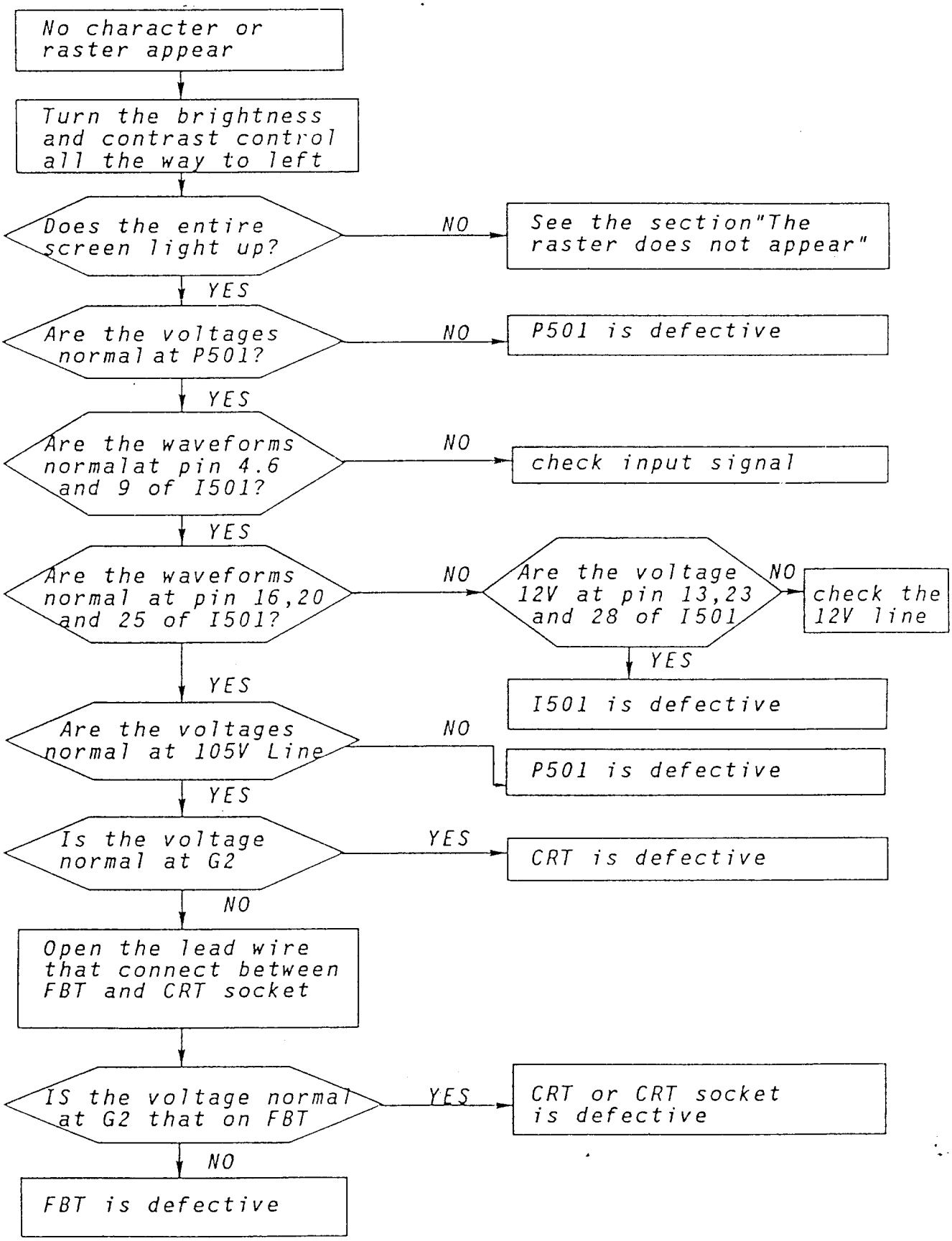
Horizontal Line
Figure 7-7

8. TROUBLESHOOTING FLOW CHART

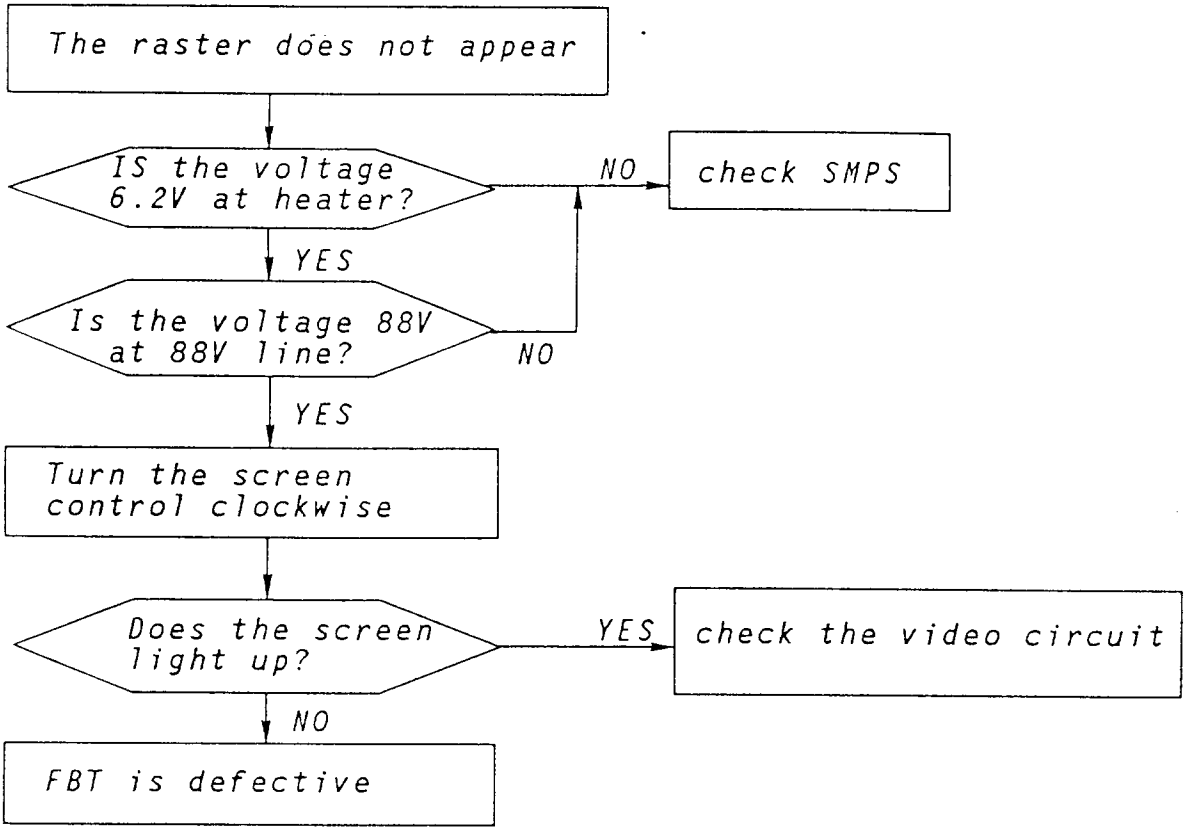
(1)



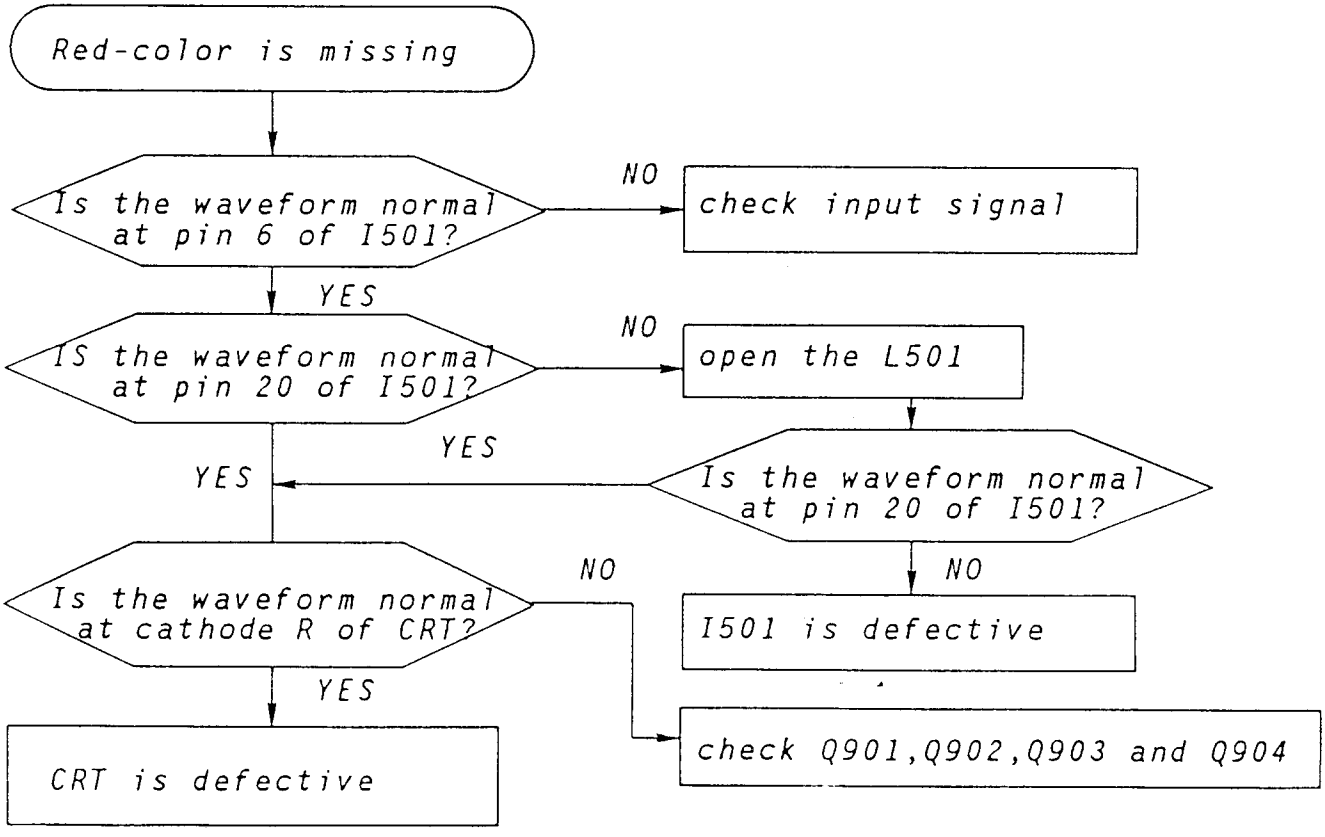
(2)


No character or raster appear
Turn the brightness and contrast control all the way to left
Does the entire screen light up?
NO
See the section"The raster does not appear"
YES
Are the voltages normal at P501?
NO
P501 is defective
YES
Are the waveforms normalat pin 4.6 and 9 of I501?
NO
check input signal
YES
Are the waveforms normal at pin 16,20 and 25 of I501?
NO
Are the voltage 12V at pin 13,23 and 28 of I501
NO
check the 12V line
YES
I501 is defective
YES
Are the voltages normal at 105V Line
NO
P501 is defective
YES
Is the voltage normal at G2
YES
CRT is defective
NO
Open the lead wire that connect between FBT and CRT socket
IS the voltage normal at G2 that on FBT
YES
CRT or CRT socket is defective
NO
FBT is defective

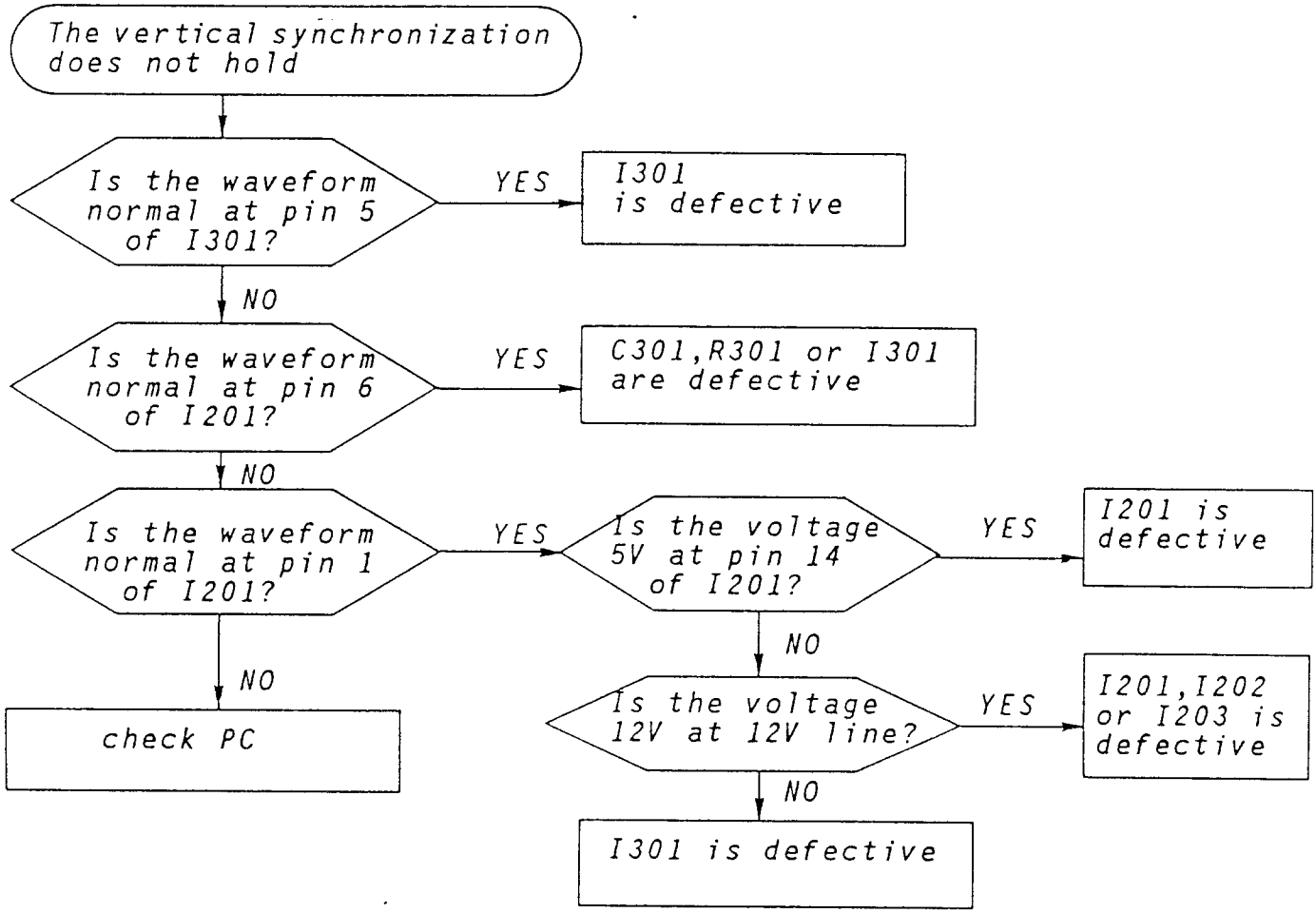
(3)


The raster does not appear
IS the voltage 6.2V at heater?
NO
check SMPS
YES
Is the voltage 88V at 88V line?
NO
YES
Turn the screen control clockwise
Does the screen light up?
YES
check the video circuit
NO
FBT is defective

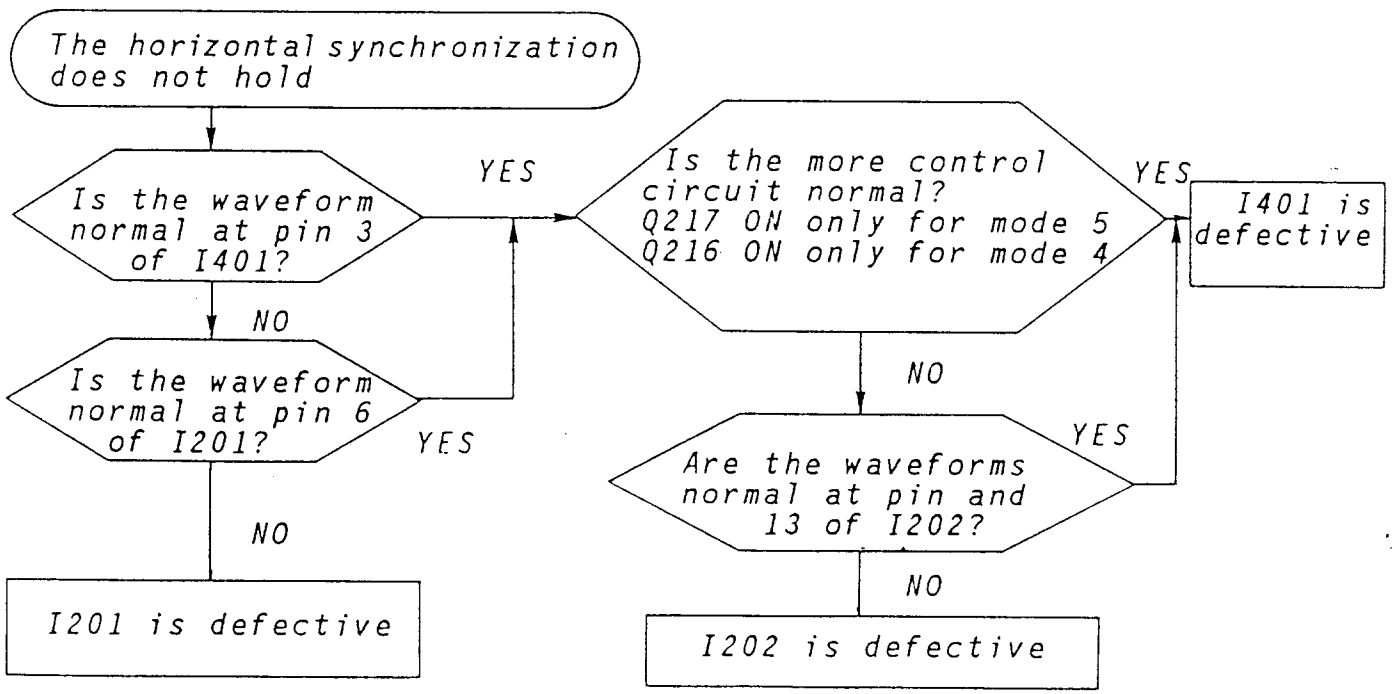
(4)


Red-color is missing
Is the waveform normal at pin 6 of I501?
NO
check input signal
YES
IS the waveform normal at pin 20 of I501?
NO
open the L501
YES
YES
Is the waveform normal at pin 20 of I501?
NO
I501 is defective
Is the waveform normal at cathode R of CRT?
NO
YES
CRT is defective
check Q901,Q902,Q903 and Q904

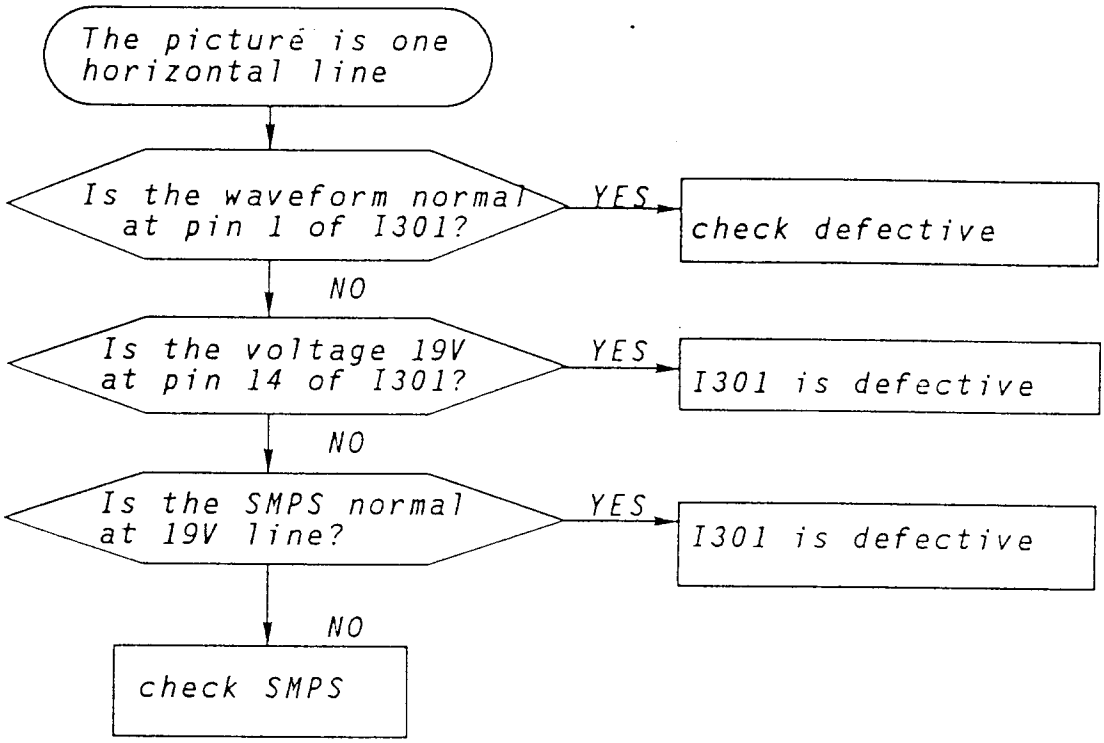
(5)


The vertical synchronization does not hold
Is the waveform normal at pin 5 of I301?
YES
I301 is defective
NO
Is the waveform normal at pin 6 of I201?
YES
C301,R301 or I301 are defective
NO
Is the waveform normal at pin 1 of I201?
YES
Is the voltage 5V at pin 14 of I201?
YES
I201 is defective
NO
check PC
NO
Is the voltage 12V at 12V line?
YES
I201,I202 or I203 is defective
NO
I301 is defective

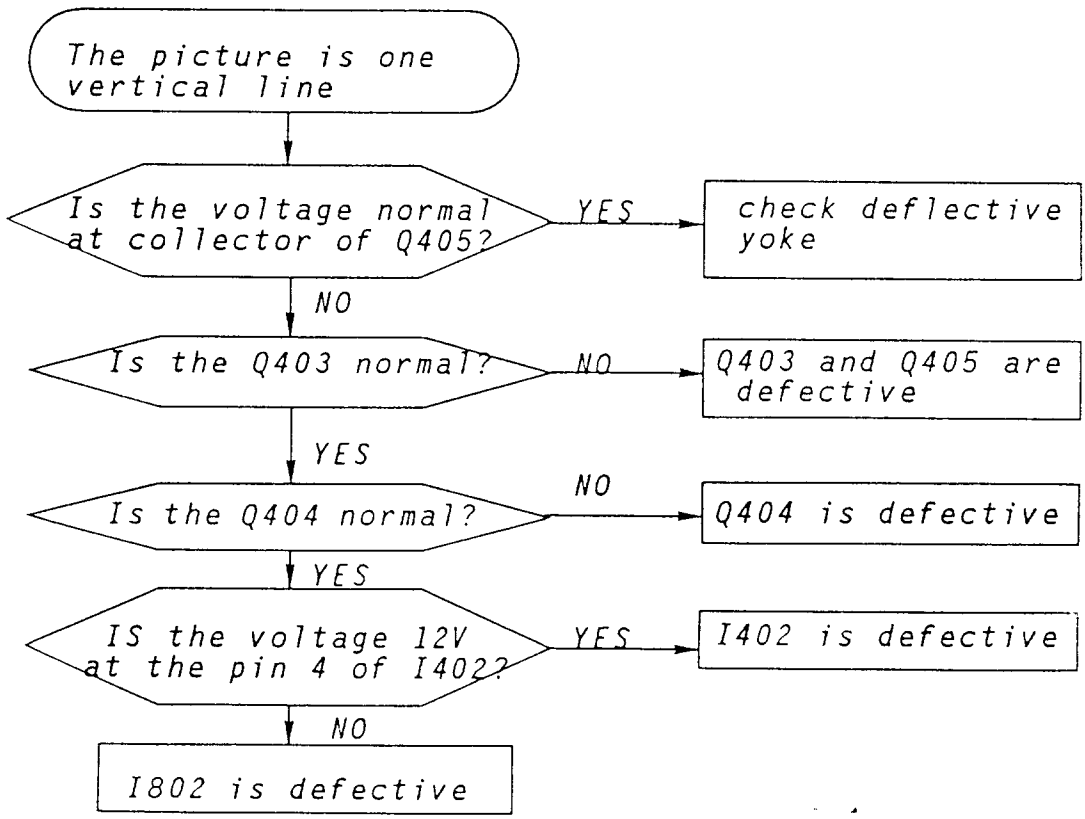
(6)


The horizontal synchronization does not hold
Is the waveform normal at pin 3 of I401?
YES
Is the more control circuit normal?
Q217 ON only for mode 5
Q216 ON only for mode 4
YES
I401 is defective
NO
Is the waveform normal at pin 6 of I201?
YES
NO
Are the waveforms normal at pin and 13 of I202?
YES
NO
I201 is defective
NO
I202 is defective

(7)


The picture is one horizontal line
Is the waveform normal at pin 1 of I301?
YES
check defective
NO
Is the voltage 19V at pin 14 of I301?
YES
I301 is defective
NO
Is the SMPS normal at 19V line?
YES
I301 is defective
NO
check SMPS

(8)


The picture is one vertical line
Is the voltage normal at collector of Q405?
YES
check deflective yoke
NO
Is the Q403 normal?
NO
Q403 and Q405 are defective
YES
Is the Q404 normal?
NO
Q404 is defective
YES
IS the voltage 12V at the pin 4 of I402?
YES
I402 is defective
NO
I802 is defective